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MAY 1960

Volume 29 Number 5

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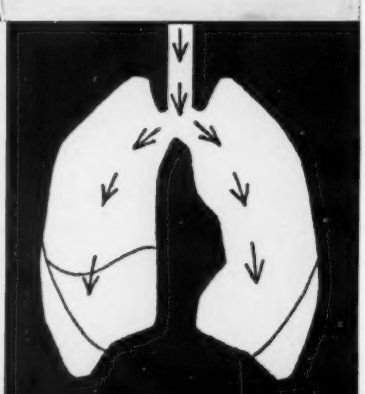

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1. Fullgrabe, E. A.: Ann. New York Acad. Sc. 68:192, 1957. 2. Jenkins, B. H.: J.M.A. Georgia 45:431, 1956. 3. Davis, O. F., et al.: Postgrad. Med. 26:719, 1959.

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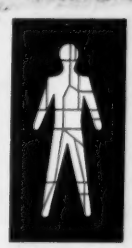

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INDUSTRIAL MEDICINE and SURGERY

ESTABLISHED 1932

The International Journal of Medicine in Industry

MAY, 1960
VOLUME XXIX
NUMBER 5

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PERSONAL NEWS AND NOTES

RICHARD J. KREBSBACH, M.D., has been named Medical Director and chief of Medical Group, for Norair Division, Northrop Corporation, Hawthorne, California. He succeeds RODGER P. MACKEY, M.D., now retired.

DR. KREBSBACH is a native of St. Paul, Minnesota. He received his M.D. degree from the University of Minnesota in 1954. He served internship at the Veterans Administration Hospital in Long Beach, California in 1954-55, and did postgraduate work at the same institution, 1955-56. In 1956, he joined Norair's Medical Department as supervisor of medical services.

He is a member of the Alpha Omega Alpha (National Honor Medical Society), Los Angeles County Medical Association, American Medical Association, California Medical Association, Industrial Medical Association, and Aerospace Medical Association.

The 4th Annual Industrial Mutual Aid and Disaster Control Conference is to be held in Cincinnati, Ohio, May 18-21, 1960. Highlights of the Conference will be a realistic and dramatic field exercise — "Disaster Strikes in Evendale"; the banquet address by LT. GENERAL JOSEPH F. CARROLL, Inspector General USAF; and an impressive "Air Power and Space Show" at Wright-Patterson AFB, Dayton.

Industrial, government and military officials and other specialists from all parts of the United States and other countries will meet in the Netherland-Hilton Hotel for three days of consideration of problems in disaster prevention and control and the utilization of Industrial Mutual Aid in coping with major disasters.

Registration can be made with or information obtained from the Evendale Mutual Aid, P.O. Box 151, Cincinnati 15, Ohio; or HQ Air Materiel Command-USAF, Att: ROBERT B. KAHN, MCPLC, Wright-Patterson AFB, Ohio. Information regarding exhibits is available for manufacturers interested in bringing their equipment or services to the attention of those responsible for disaster control and prevention in industrial communities.

HARRY E. UNGERLEIDER, M.D., was named Vice President and Medical Director of Standard Security Life Insurance Company of New York. DR. UNGERLEIDER was formerly Director of Medical Research for the Equitable Life Assurance Society and is a former President of the Association of Life Insurance Medical Directors.

J. A. QUIGLEY, Director of the Health and Safety Division of the National Lead Co., of Ohio, has been elected President of the American Academy of Occupational Medicine for the coming year. The election was conducted during the 12th annual meeting of the Academy held in Williamsburg, Va. Previously, DR. QUIGLEY had served terms as treasurer and vice president, and member of the board of directors.

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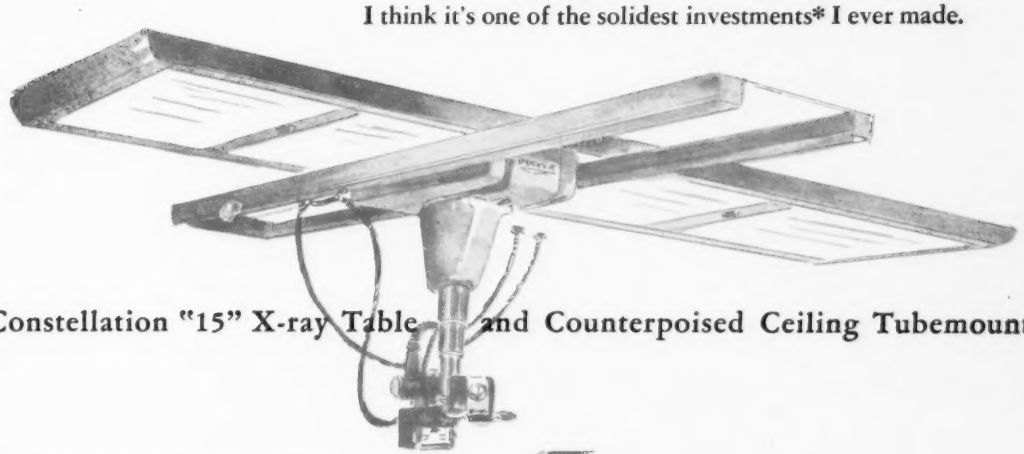

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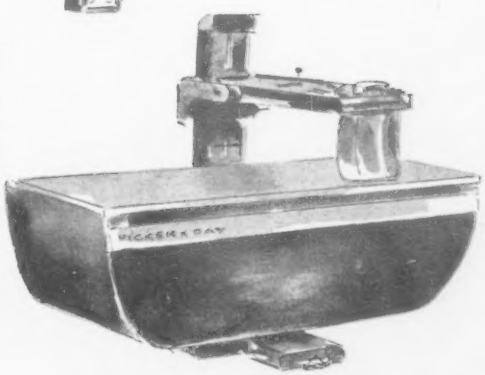

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Pan-Pacific Surgical Association, Eighth Congress, will meet in Honolulu, Hawaii, September 27 to October 5, 1960.

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For information write Dr. F. J. Pinkerton, Director General of the Pan-Pacific Surgical Association, Suite 230, Alexander Young Building, Honolulu 13.

Aerospace Medical Association will present its 31st Annual Meeting at the Americana Hotel, Miami Beach, Florida, May 9 to 11, 1960.

The scientific program will include papers on requirements and hazards of modern air travel, piloting and research. Many military applications will be considered. For information, write: Aerospace Medical Association, Washington National Airport, Washington 1, D. C.

Yale University, Summer School of Alcohol Studies, eighteenth annual session, will be presented June 26 to July 22, 1960, as an interdisciplinary study of problems of alcohol and alcoholism.

Lectures and seminars under the direction of specialists drawn from the social sciences, medicine and psychiatry, religion, education and public health will be presented, as well as seminars for public health personnel on the epidemiology of alcoholism, tuberculosis and alcoholism, community mental health services and alcoholism.

There will be workshops for physicians, case workers, psychologists, clergy, nurses, educators, probation, parole and correctional officers, personnel directors and supervisors in industry, community leaders. Enrollment is limited to 275 students.

For information write: Registrar, Yale Summer School of Alcohol Studies, 52 Hillhouse Avenue, Yale Station, New Haven, Connecticut.

ROBERT T. NOLTA, M.D., has assumed the position of Medical Director for the Chevrolet plant in Janesville, Wisconsin.

DR. NOLTA is the first full-time Medical Director at Chevrolet in many years. A few months ago GEORGE H. PETERSON, M.D., was named Fisher Body Medical Director. Prior to that the two plants utilized the services of JOHN COYNE, M.D., on a split basis. DR. COYNE left Janesville last fall to take a post in Pennsylvania.

DR. NOLTA entered the University of Illinois under the ASTP to study engineering. After completing a six months course in January, 1946, he was assigned to the 9th Infantry Regiment. He was later transferred to headquarters general troops, adjutant general's department, and received his discharge from the Army in May, 1947.

Following completion of a premedical course at the University of Detroit, he entered Loyola (Chicago) University's School of Medicine, graduating from there in June, 1954.

DR. NOLTA interned at Mount Carmel Mercy Hospital in Detroit for one year. After his residency in that hospital's internal medicine department, DR. NOLTA began practicing general medicine at Northland Center, Detroit. He later moved to Atlanta, in northern Michigan, and was the only practicing physician in that community of 1,000 persons.

WILSON P. RICHARDS, M.D., was appointed group Medical Director for seven Chrysler Corporation plants, it was announced by M. W. JOCZ, M.D., corporate Medical Director.

In his new position DR. RICHARDS will be responsible for directing activities of medical departments and facilities at the Center Line, Detroit Tank, Highland Park, Marysville, and Michigan Missile plants in the Detroit area, at the Chrysler Airtemp plant in Dayton, Ohio, and at the Missile Division facilities in Huntsville, Alabama.

DR. RICHARDS will continue to serve also as staff specialist in internal medicine for the corporate medical department, the position he has held since joining Chrysler in August of 1959.

He was previously engaged in medical administrative work for five years at the Wayne County General Hospital, where he was chief resident in medicine. From 1951 to 1953 he served as a medical officer in the United States Army and as an instructor at the Wayne State University College of Medicine.

DR. RICHARDS is a graduate of DePauw University, Greencastle, Ind., and of the University of Michigan Medical School. He is a member of the American and Michigan Heart Associations, the American Association for the Advancement of Science and the New York Academy of Sciences.

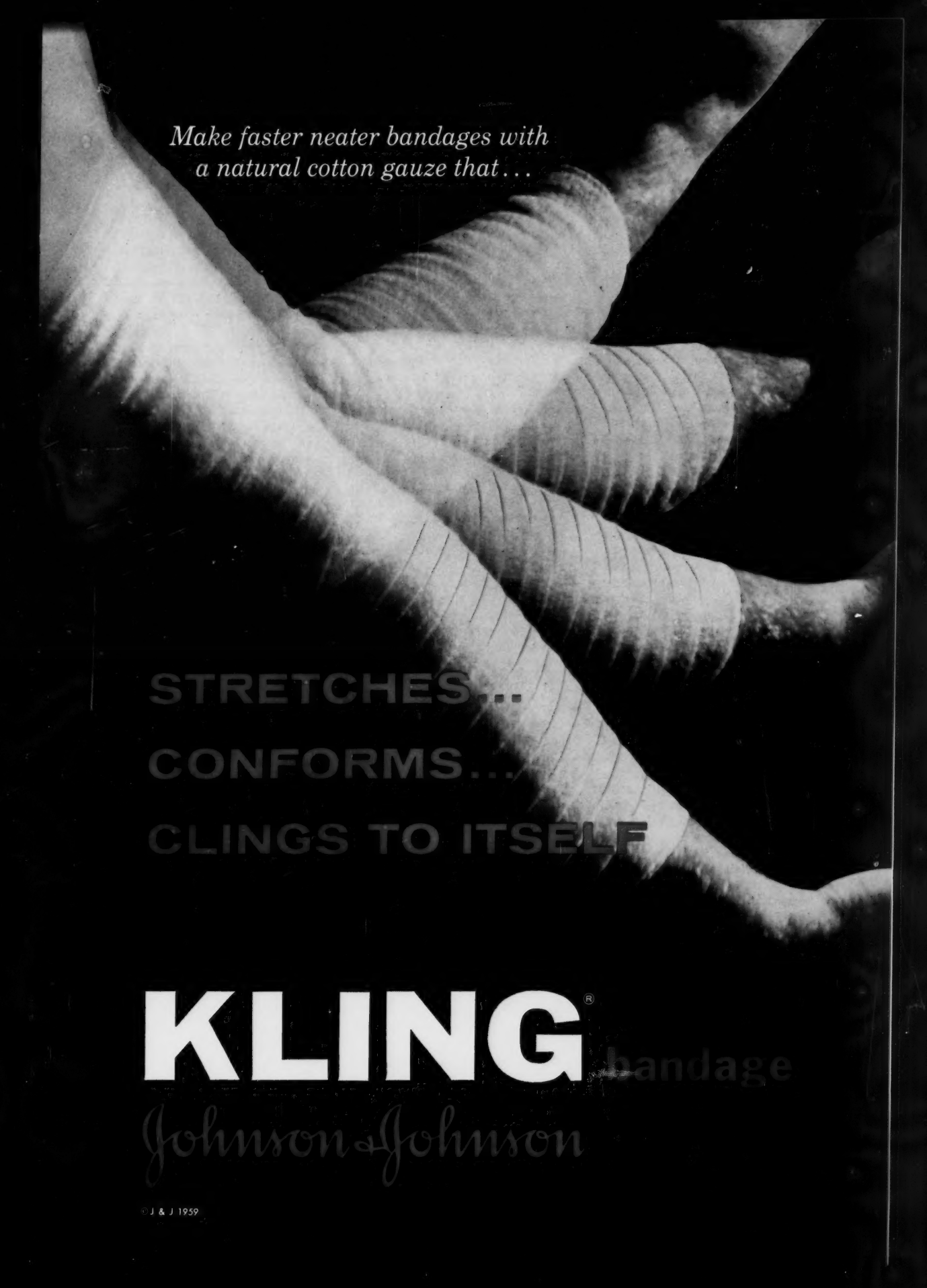
Forty-Fifth Annual Conference of the New England Industrial Nurses' Association will be held at the Mt. Washington Hotel in Bretton Woods, N. H., June 10-12. There will be a panel discussion on the theme of the Conference "Improved Communications Between The Nurse, Physician and Management." Dr. Kenneth Smith of New York, Industrial Physician for Johns Manville Corporation, will represent industrial physicians; Mrs. Margaret Milne, RN, of Chicopee Mfg. Co., of Manchester, N. H., is Moderator. Mr. William Mahoney, Personnel Manager for Webster Valve Co., of Franklin, N. H., and Mr. Neil Nelson, Safety Engineer for American Mutual Liability Co., of Manchester, N. H. will speak.

JOHN FINLEY, M.D., has assumed the position of Medical Director for Canada of John Wyeth and Brothers Limited (Canada), whose head office is in Walkerville. A native of Meaford, DR. FINLEY is a medical graduate of Queen's University and has practiced in Meaford for 20 years.

GILBEART H. COLLINGS, JR., M.D., has been appointed Medical Director of Standard Oil Company (Indiana). He will spend the greater part of his time in coordinating the company-wide medical program. He has been associate director since last year, when he came to Standard from Crane Co. where he was Medical Director.

BRYCE B. REEVE, M.D., retired as Medical Director after more than 36 years' company service.

Two other appointments will be made in Standard's medical department: PAUL D. HALLEY, is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to be Director of industrial hygiene, and MARVIN R. ALBERG, M.D., will be chief physician in charge of the general office medical department. Both are presently with the company.

For more than a quarter of a century DR. REEVE as Medical Director has directed the extensive medical program throughout Standard Oil Company. The medical department's activities include a preventive program with careful preplacement and periodic health examinations and prompt attention to injuries.

DR. REEVE joined Standard in 1923 as a physician in its Whiting, Ind., refinery first-aid hospital. In 1934 he became Medical Director with headquarters in the general office at Chicago.

After graduating from Indiana University School of Medicine in 1921, he served internship at Passavant Memorial hospital in Chicago and resumed teaching, this time with nurses as his students of pharmacology. He practiced surgery in Arkansas for a year, and then became associated with Standard Oil Company (Indiana).

DR. REEVE was honored last year with a Certificate of Appreciation by the American Petroleum Institute and another by the National Safety Council. He has been a member of the API medical advisory committee and chairman of the health committee of the National Safety Council.

He is a Fellow of the Industrial Medical Association. He is certified by the American Board of Preventive Medicine in Occupational Medicine. He was a member of the Chicago Medical Directors' Club and the national Medical Directors' Forum.

He is a member of the Chicago and Illinois State Medical societies, American Medical Association, Central States Society of Industrial Medicine and Surgery, American College of Preventive Medicine, and American Industrial Hygiene Association.

DR. COLLINGS came to Standard Oil Company (Indiana) in 1959 after nearly 20 years of practice as a specialist in occupational medicine, including posts in this field with Bethlehem Steel Company, the Tennessee Valley Authority, and Crane Co. He also served with the U. S. Army Medical Corps at the Army Environmental Health Laboratory, Army Chemical Center, Md.

He is a native of Clemson, S. C. and was graduated from Clemson College. He was granted his M.D. degree by Emory University School of Medicine. He interned at Maryland General Hospital, Baltimore, Md., and took graduate work in occupational medicine at Johns Hopkins University.

DR. COLLINGS is a Fellow of the Industrial Medical Association, American Public Health Association, and American Academy of Occupational Medicine. He is a member of the American and the Illinois Medical associations, the Chicago Medical Society, the American College of Preventive Medicine, the Central States Society of Industrial Medicine and Surgery, Medical Directors' Club, and the national Medical Directors' Forum.

DR. ALBERG joined Standard in 1954 as physician at the Whiting, Ind., refinery. He was transferred to the medical department in the general office at Chicago in 1959.

He was graduated from the University of Colorado School of Medicine. He interned and was resident physician at Kansas City, Mo., General hospital and had postgraduate training at the University of Michigan for a master's degree in public health.

Died

ROBERT T. LEGGE, M.D., F.A.C.S., 87, Professor Emeritus, University of California, distinguished for his 60-year career in industrial medicine, as physician, surgeon, teacher, writer, scholar, historian, internationally famous as industrial medicine's personable and gracious ambassador, March 21, at Berkeley, apparently from a heart attack.

DR. LEGGE was born in San Francisco in 1872. He received his medical degree at University of California Medical School in 1899, and went immediately into industrial medicine as chief surgeon for an extensive lumbering operation at McCloud, in northern California. His remarkable achievements there during the next 15 years are described in a career profile previously published in this Journal (*Indus. Med. & Surg.*, 20:5, 236 [May] 1951). In January, 1915, he joined the University of California faculty as Professor and Chairman of the Department of Hygiene, University Physician, and Director of the College Hospital at Berkeley. Later he was appointed Lecturer in Industrial Medicine at the U. C. Medical School in San Francisco, and established courses that led to the first industrial health programs in California. As University Physician from 1915 to 1938, he inaugurated the country's first student health service. And he planned and built the Cowell Memorial Hospital on the Berkeley campus, the first student hospital approved by the American College of Surgeons. In 1942 he became Professor Emeritus.

At San Francisco, in 1915, DR. LEGGE was made chairman of the APHA Section on Industrial Hygiene; at the organization meeting of the AAIP & S at Detroit, in 1916, he was elected First Vice-President. He organized the Section on Industrial Medicine of the California State Medical Society; was one of the organizers of the Western Association of Industrial Physicians and Surgeons, and its first President; and was the first President of the Pacific Section of the American College Health Association.

In 1924, DR. LEGGE received a diploma from the University of Vienna for graduate studies, and from that year was a member of the Permanent Committee and International Association on Occupational Health. He was a regular attendant at the Congresses in Europe, and was instrumental in bringing the 1960 Congress to New York this year. In the AMA he was Chairman of the Section on Preventive and Industrial Medicine and Public Health, and he served two terms as a member of the Council on Industrial Health.

In 1951, he was given industrial medicine's highest honor, the Knudsen Award; and he was an Honorary Member of many organizations. On the University of California's Charter Day in 1958 he received an honorary doctorate.

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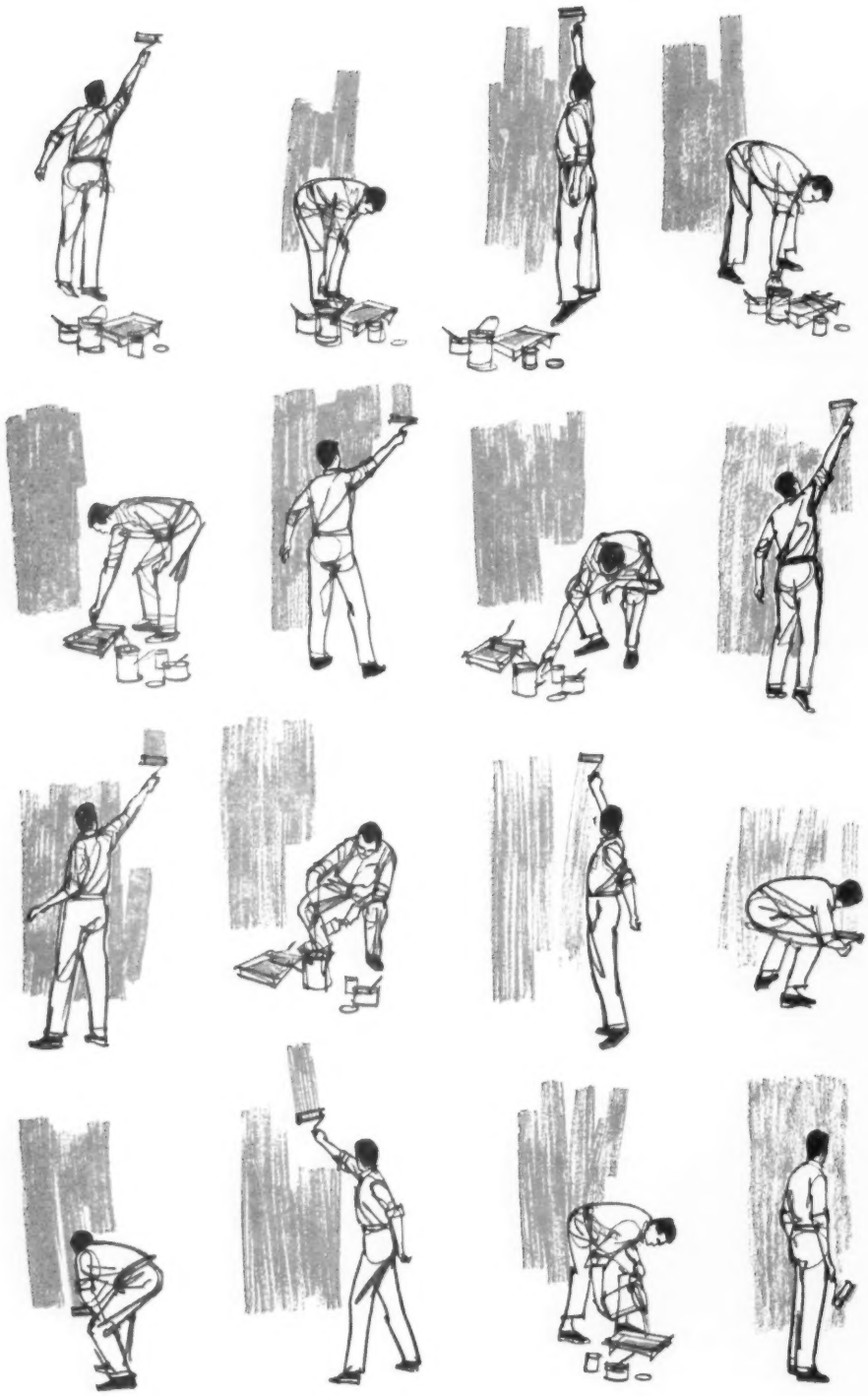

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1. Kelly, J. J., Jr.: Am. J. Med. Sci. *232*:119-128 (Aug.) 1956.

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References: 1. McGavack, T H.: Clin. Med. *6*:997 (June 1959). 2. Plotz, C. M.: Paper on administration of corticosteroids in rheumatoid arthritis, presented at the 11th Annual Scientific Assembly of the New York Academy of General Practice, New York City, (October 20, 1959). 3. Williams, G. T: Southern Med. J. *52*:267-273 (March 1959).

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IN DYSMENORRHEA, "tranquilaxant" treatment with *Trancopal*®

keeps most patients *"on the go..."*

Since "... dysmenorrhea is a symptom complex which has no one particular origin ..."[1] tranquilaxant therapy, directed at *two* factors, has been particularly successful in alleviating menstrual pain and discomfort. The tranquilaxant, Trancopal "... combines the properties of tranquilization and skeletal muscle relaxation, with no concomitant change in normal consciousness."[2]

"... able to continue their normal activities..."[3]

Good to excellent results with Trancopal were obtained by Lichtman[3,4] in 139 of 173 patients with dysmenorrhea and premenstrual tension.[4] They "... had not only their symptoms controlled with chlormethazanone [Trancopal] but, even more important, the patients were in many instances able to continue their normal activities where previously they had been considerably restricted in their activities."[3]

Stough[5] studied 75 patients during 125 menstrual periods and found that complete or moderate relief with Trancopal was obtained during 86.4 per cent of the periods.

Shanaphy[2] reported satisfactory results with tranquilaxant treatment with Trancopal in 41 of 50 patients with dysmenorrhea; 20 of these patients had been refractory to other methods of treatment.

"Side effects were noticeably absent ..."[5]

Dosage: 100 or 200 mg. orally three or four times daily.

How Supplied: Trancopal Caplets®
100 mg. (peach colored, scored), bottles of 100.
200 mg. (green colored, scored), bottles of 100.

References: **1.** Woodbury, R. A., in Drill, V. A.: Pharmacology in Medicine, ed. 2, New York, McGraw-Hill Book Company, Inc., 1958, p. 1003. **2.** Shanaphy, J. F.: *Current Therap. Res.* 1:59, Oct., 1959. **3.** Lichtman, A. L.: *Kentucky Acad. Gen. Pract. J.* 4:28, Oct., 1958. **4.** Lichtman, A. L.: Scientific Exhibit, International College of Surgeons, Miami Beach, Fla., Jan. 4-7, 1959. **5.** Stough, A. R.: *J. Oklahoma M. A.* 52:575, Sept., 1959.

Winthrop LABORATORIES • New York 18, New York

TRANCOPAL (BRAND OF CHLORMEZANONE) AND CAPLETS, TRADEMARKS REG. U.S. PAT. OFF.

PROFESSIONAL MODEL USED FOR PHOTOGRAPH.
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IN A WIDE RANGE OF
COMMON SKIN DISORDERS

NEW FURACIN®-HC CREAM

(NITROFURAZONE 0.2% AND HYDROCORTISONE 1%, EATON)

INFECTED AND POTENTIALLY INFECTED DERMATOSES / PYODERMAS / ULCERS
BURNS / AFTER PLASTIC, ANORECTAL AND MINOR SURGERY

FURACIN-HC Cream combines the anti-inflammatory and antipruritic effect of hydrocortisone with the dependable antibacterial action of FURACIN®, brand of nitrofurazone—the most widely prescribed single topical antibacterial. The broad bactericidal range of FURACIN includes stubborn staphylococcal strains, and there has been no development of significant bacterial resistance after more than a dozen years of widespread clinical use. FURACIN is gentle to tissues, does not retard healing; its low sensitization rate is further minimized by the presence of hydrocortisone.

FURACIN-HC Cream is available in tubes of 5 Gm. and 20 Gm. Fine vanishing cream base, water-soluble.

NITROFURANS—a unique class of antimicrobials / EATON LABORATORIES, NORWICH, NEW YORK

Products of Eaton Research

To lick a stubborn industrial problem...

AQUA IVY AP® TABLETS

for desensitization to

POISON IVY and POISON OAK

For outdoor workers one of the most annoying problems is the danger of poison ivy and poison oak. For employers the problem means absenteeism for treatment...or prophylactic injections.

Now, however, by oral prophylaxis with AQUA IVY TABLETS poison ivy and poison oak among industrial workers can be a thing of the past. And here's why:

Extensive clinical tests show that AQUA IVY TABLETS:

...ARE EFFECTIVE —*good to excellent results in 95% of cases tested.*[1]

...GIVE LASTING IMMUNITY —*patch tests show immunity continues up to 12 months.*[2]

...ARE SAFE—*no sensitization, flare-up of existing lesions or gastro-intestinal irritation. Proved suitable for children.*[1-4]

Protection established before outdoor work begins

Because immunization procedures require a build-up period, AQUA IVY TABLETS are taken in advance of the season to be sure of protection when needed. Many experience benefits after 100 tablets sufficient to provide summer-long immunity. This requires about 8 weeks of tablet taking as directed. Others will require the dosage up to 200 tablets.

To assure your workers of protection against poison ivy and poison oak this season—put them on AQUA IVY TABLETS now! You'll see a big difference in absenteeism and in general outdoor working efficiency once the fear, pain and inconvenience of poison ivy or poison oak dermatitis is removed.

AVAILABLE: *bottles of 1,000, 300 and 100 tablets, supplied through usual drug channels.*

REFERENCES:

1. Langs, R. J. and Strauss, M. B.: J. Allergy. 30: 130-139 (March-April), 1959.
2. Langs, R. J., Fuchs, A. M., and Strauss, M. B.: Indus. Med., 28: 6, 257-261 (June); 1959.
3. Kligman, A. M.: J.A.M.A., 171: 592, (Oct. 3) 1959.
4. Personal Communications.

For free illustrated booklet "Facts You Should Know About Poison Ivy and Poison Oak" write Dept. IM

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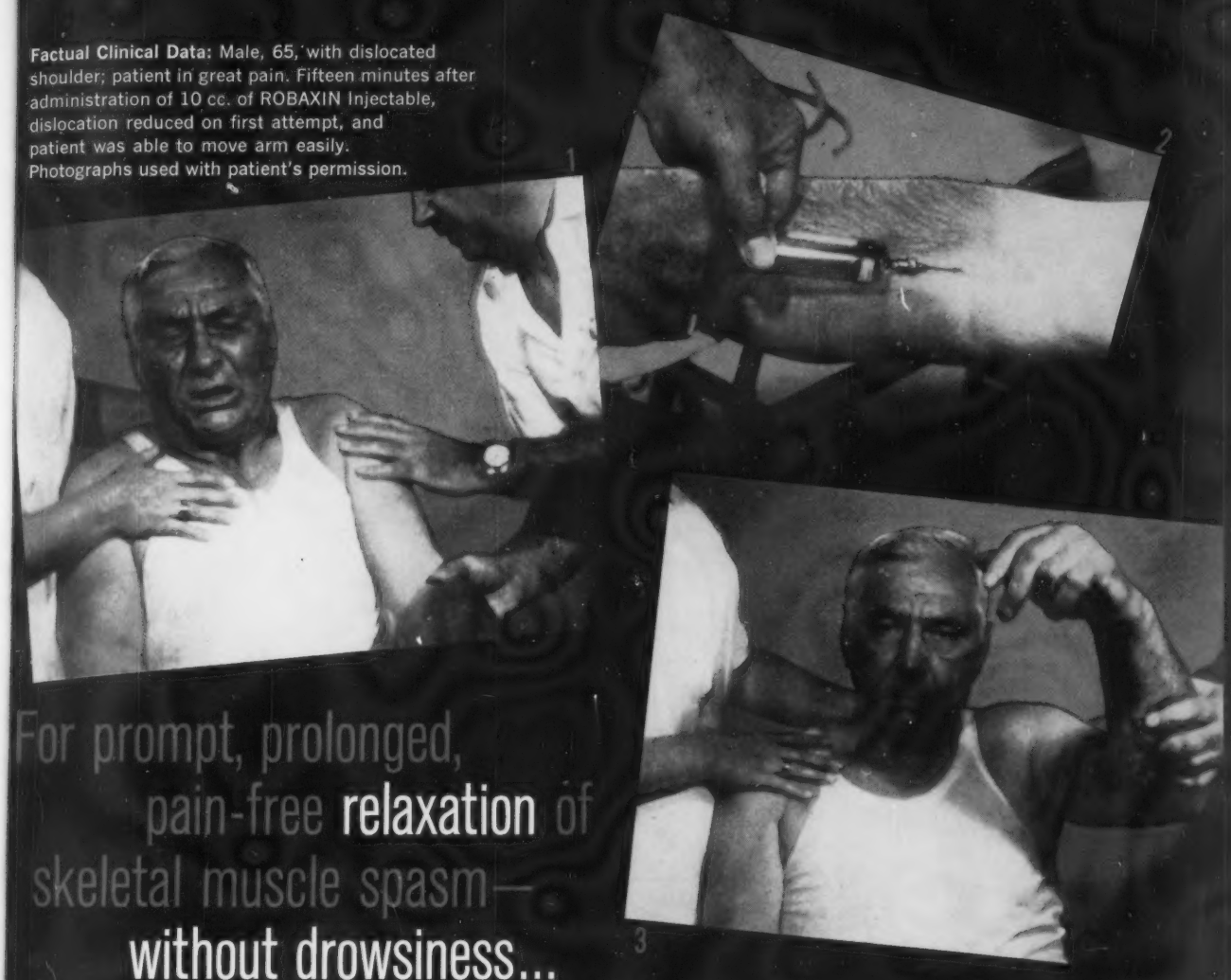
Factual Clinical Data: Male, 65, with dislocated shoulder; patient in great pain. Fifteen minutes after administration of 10 cc. of ROBAXIN Injectable, dislocation reduced on first attempt, and patient was able to move arm easily. Photographs used with patient's permission.



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ROBAXIN Tablets: for initial relief, or to maintain relaxation originally induced by ROBAXIN Injectable. Virtually free from adverse side effects, including drowsiness.

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REFERENCES: 1. Carpenter, E. B.: Southern M. J. 51:627, 1958. 2. Forsyth, H. F.: J.A.M.A. 167:163, 1958. 3. Grisolia, A., and Thomson, J. E. M.: Clin. Orthopaedics 13:299, 1959. 4. Hudgins, A. P.: Clin. Med. 6:2321, 1959. 5. Lewis, W. B.: California Med. 90:26, 1959. 6. O'Doherty, D. S., and Shields, C. D.: J.A.M.A. 167:160, 1958. 7. Park, H. W.: J.A.M.A. 167:168, 1958. 8. Plumb, C. S.: Journal-Lancet 78:531, 1958. 9. Poppen, J. L., and Flanagan, M. E.: J.A.M.A. 171:298, 1959. 10. Schaubel, H. J.: Orthopedics 1:274, 1959.

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Provera (medroxyprogesterone acetate) 2.5 mg.
Cardrase (ethoxzolamide) ..... 35 mg.
Levanil (ectylurea) ..... 300 mg.

DOSAGE: 1 tablet 1 or 2 times daily, 5-10 days before the period.

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corrective therapy Because Cytran contains the new progestin, Provera,† you can now reach the *cause* of premenstrual tension—hormonal imbalance. Estrogen-progesterone ratio is adjusted to more normal premenstrual balance. Thus even abdominal discomfort, shakiness, fatigue—symptoms incompletely controlled by mere symptomatic treatments—are effectively relieved.

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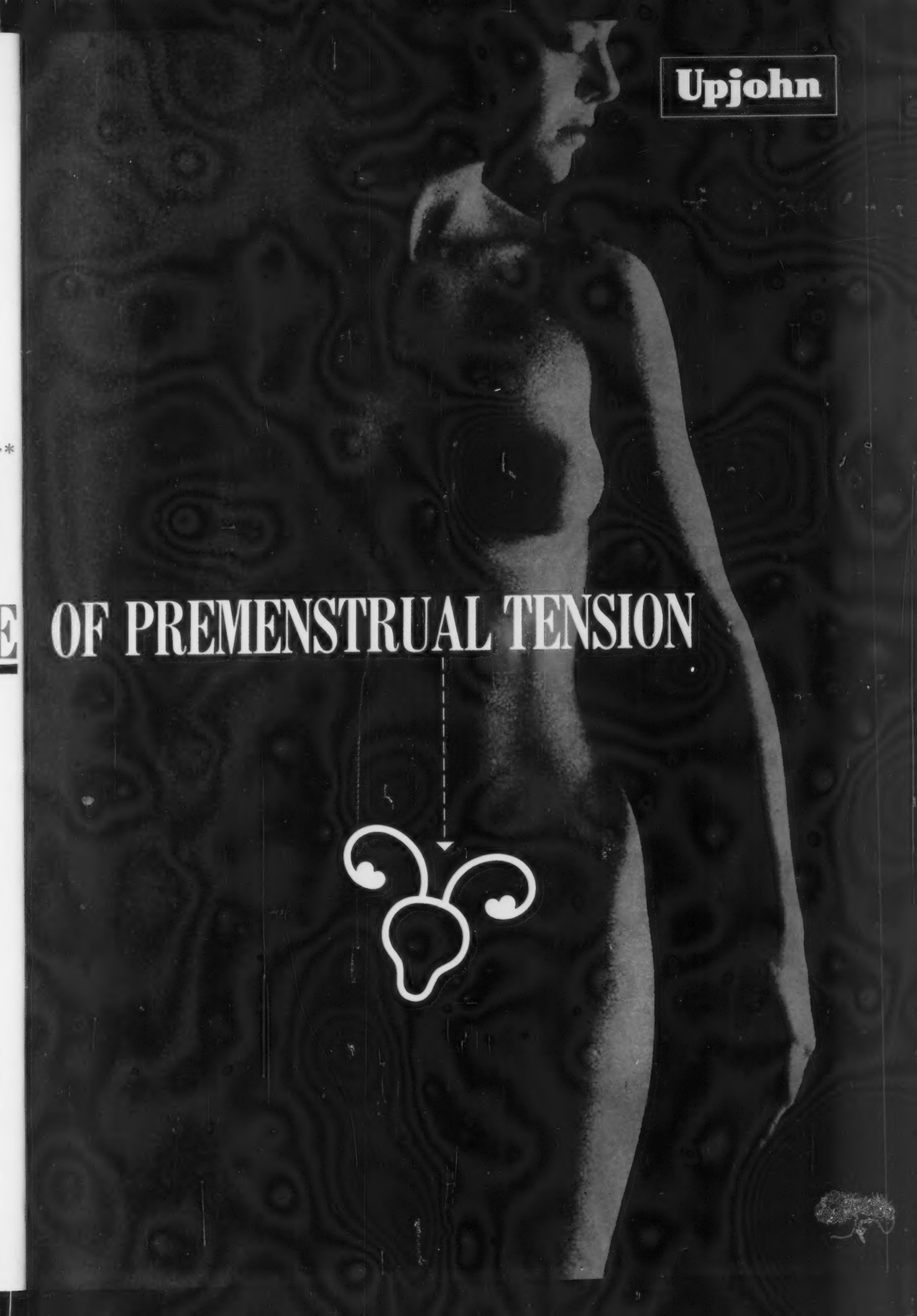
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GRiFULVIN®

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ORAL ANTIFUNGAL AGENT

Before treatment, **T. rubrum** infection.

After 2 months' treatment with GRIFULVIN.

typical response of tinea pedis to GRIFULVIN

- itching and burning relieved in **2 to 6 days**
- vesicles and scaly patches disappear completely; cultures and KOH scrapings usually become negative in **2 to 6 weeks**
- side effects are rare, mild and transitory

Average dose: 250 mg. q.i.d. Adjunctive treatment with topical keratolytic agents will aid in eradicating the fungi from the skin of the feet.

Supplied: 250 mg. scored tablets, colored aquamarine, imprinted McNEIL, bottles of 16 and 100.

Blank, H.; Smith, J. G., Jr.; Roth, F. J., Jr., and Zaias, N.: J.A.M.A. **171**:2168 (Dec. 19) 1959.

Photographs courtesy of Harvey Blank, M.D., Miami, Florida

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NEW spray-on surgical film controls bacteria even resistant hospital "staph"

REZIFILM is a methacrylate resin. On the skin, it forms a clear, firm, flexible barrier against airborne microorganisms. This physical protection is supplemented by the antibacterial activity of TMTD (tetramethylthiuram disulfide), readily diffusible from the plastic film to the skin beneath. TMTD, which is neither an antibiotic nor a sulfonamide, is highly active against a wide range of pathogenic bacteria, including many organisms resistant to the most commonly used antibiotics.[1]

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- no sensitization reactions reported
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REZIFILM is *not* indicated as a dressing for second or third degree burns or for bleeding or granulating wounds.

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Rezifilm is applied after prepping of the surgical area. It functions as a secondary drape.

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Rezifilm is applied following final closure of the incision. It provides comfortable protection against infection and irritation.

Compare the antibacterial activity of **REZIFILM**[6]

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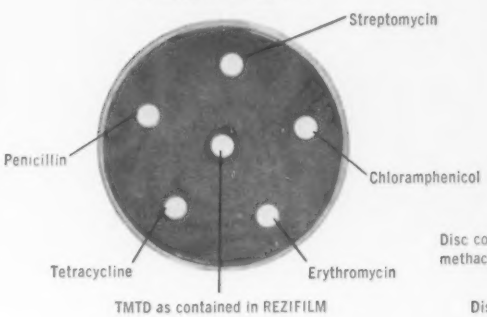
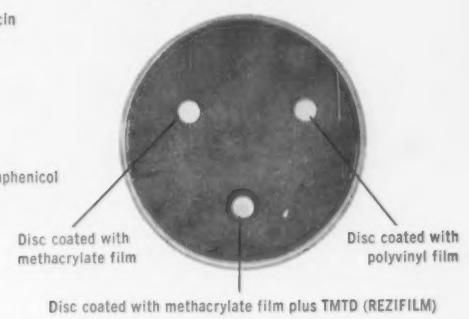


Comparison with other spray film preparations


Disc coated with methacrylate film
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Disc coated with methacrylate film plus TMTD (REZIFILM)

Streaked cultures of coagulase-positive Staphylococcus aureus, phage type 80/81; incubated 24 hours at 37°C.

An interesting 16 mm. color motion picture film (10 minutes) showing the use of REZIFILM *in surgery is available free of charge. Excellent for hospital and medical society meetings. Write to: Professional Service Department, Squibb, 745 Fifth Avenue, New York 22, N. Y.*

Supplied: 6 oz. (avd.) spray dispenser cans.

References: 1. Eisenberg, G. M.: *Antibiotic Med. & Clin. Ther.*, 6:594 (Oct.) 1959. 2. Thomson, J. E. M.: Report to The Squibb Institute for Medical Research, June, 1957. 3. Maloney, J. V. and Mulder, D. G.: *Am. Surgeon* 23:388 (April) 1957. 4. Bucher, R. M.: Report to The Squibb Institute for Medical Research, July 3, 1957. 5. Hammond, J. A.: Report to The Squibb Institute for Medical Research, May 3, 1957. 6. Eisenberg, G. M.; Weiss, W.; Spivack, A. P.; Bassett, J. G.; Ferguson, L. K., and Flippin, H. F.: Adapted from Scientific Exhibit, A.M.A. Meeting, June 8-12, 1959.

- *provides skin asepsis, both preoperatively and postoperatively*
- *preoperative preparation made more convenient and more secure*
- *wound always in sight through window-clear film*
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transparent plastic barrier
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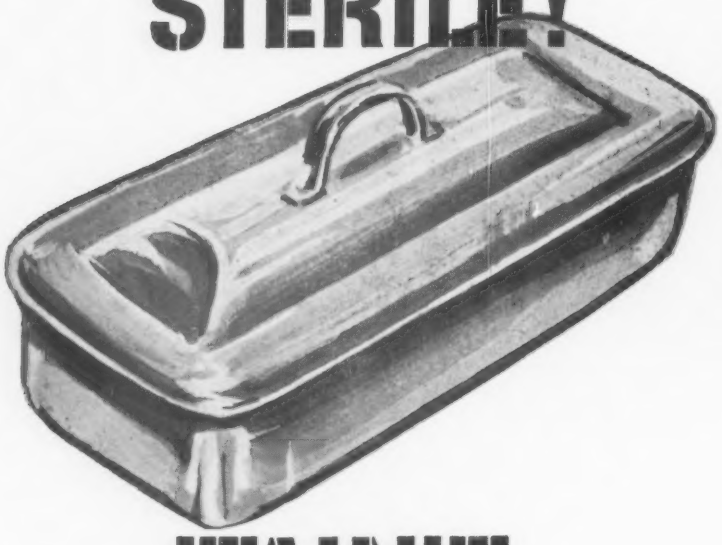

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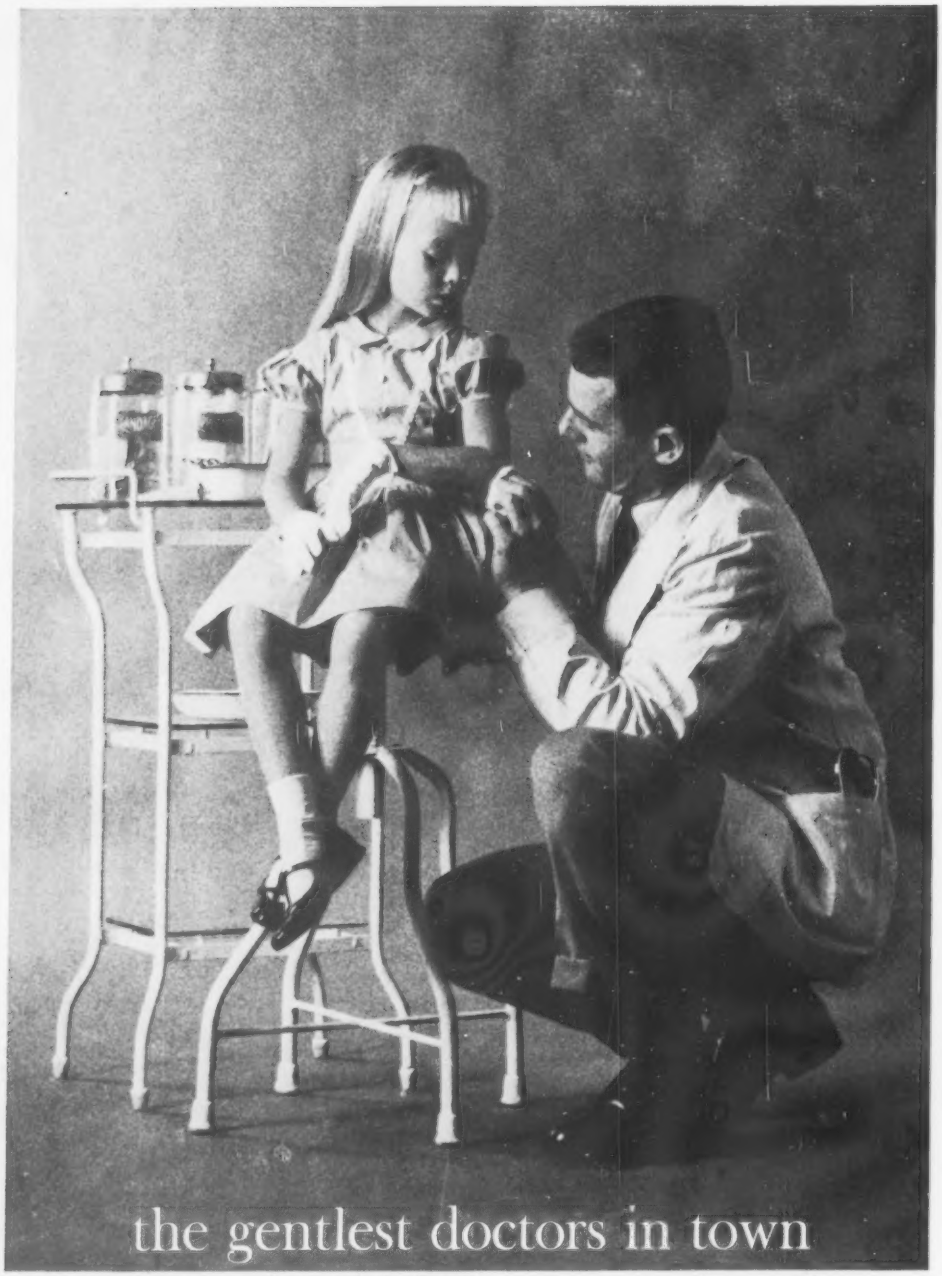

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In 1957, this nation's food supplied per person per day . . .

3,180 calories provided by 96 gm. of protein . . .
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1.84 mg. thiamine . . . 2.35 mg. riboflavin . . .
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106 mg. vitamin C.

Of the 96 gm. of protein per person per day . . . ⅔ was supplied by foods of animal origin and ⅓ by foods of plant origin . . . ⅓ by meat, poultry and fish . . . ¼ by milk and dairy foods . . . 1/5 by flour and cereal products . . . 1/7 by vegetables and fruits . . . and 1/14 by eggs. This food supply provides generous amounts of essential amino acids.

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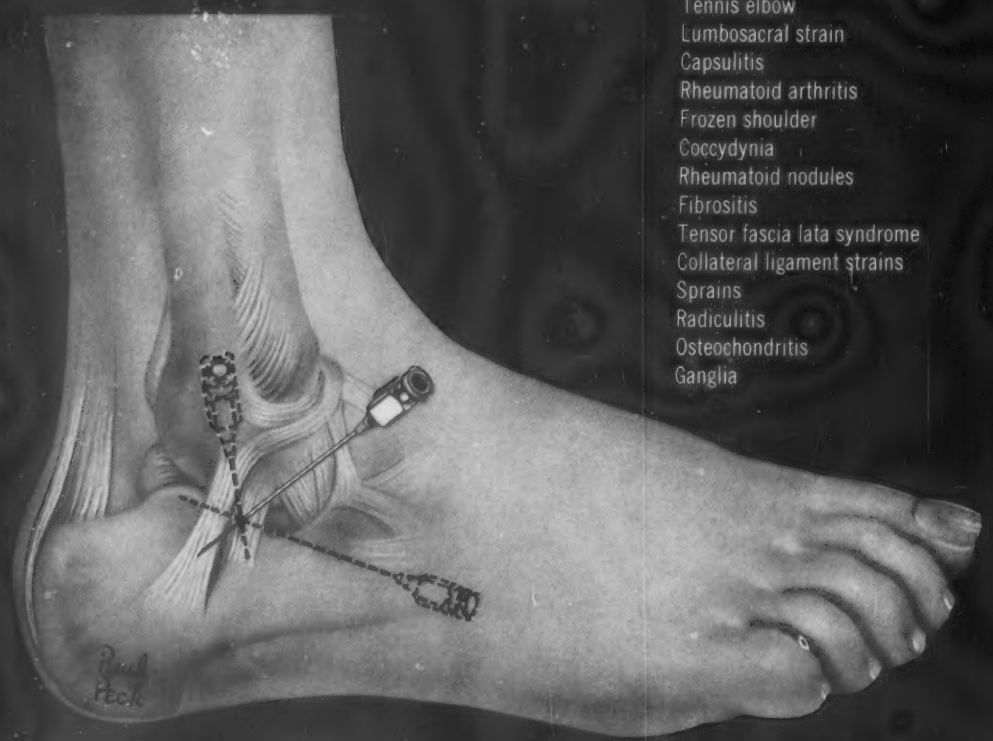
for relief that lasts – longer

in *SPRAINS*—
reduces tenderness,
swelling and
limitation of motion



- Osteoarthritis
- Acute gouty arthritis
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- Tendinitis
- Trigger finger
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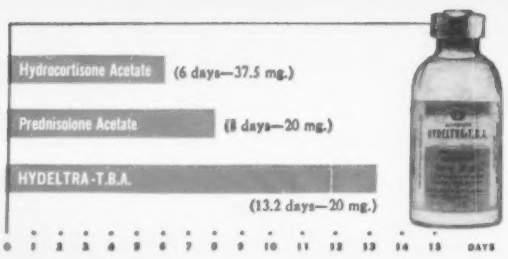
Anti-inflammatory effect lasts longer than that provided by any other steroid ester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(6 days—37.5 mg.)
Prednisolone Acetate
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HYDELTRA-T.B.A.
(13.2 days—20 mg.)
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DOSAGE: the usual intra-articular, intra-bursal or soft tissue dose ranges from 20 to 30 mg. depending on location and extent of pathology.

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ready for immediate use to soothe, protect, stimulate healing in—

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lacerated, denuded, raw surface tissues

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INTRAMUSCULARLY SUBCUTANEOUSLY INTRAVENOUSLY

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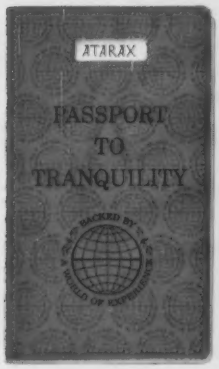

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(brand of hydroxyzine)

World-wide record of effectiveness—over 200 laboratory and clinical papers from 14 countries. **Widest latitude of safety and flexibility**—no serious adverse clinical reaction ever documented. **Chemically distinct among tranquilizers**—not a phenothiazine or a meprobamate. **Added frontiers of usefulness**—antihistaminic; mildly antiarrhythmic; does not stimulate gastric secretion.

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IN AMBULATORY NEUROTICS	"Since this drug does not impair psychic function ... it is especially well suited for ambulatory neurotics who must work, drive a car, or operate machinery." Ayd, F. J., Jr.: New York J. Med. **57**:1742 (May 15) 1957.	Garber, R. C., Jr.: J. Florida M. A. **45**:549 (Nov.) 1958. Menger, H. C.: New York J. Med. **58**:1684 (May 15) 1958.
IN PREMENSTRUAL TENSION	"The consensus appears to be that this agent has a definite calming effect on nervous and agitated subjects with symptoms such as ... premenstrual tension...." Shalowitz, M.: Geriatrics **11**:312 (July) 1956.	Schuller, E.: Gaz. des Hôpitaux **129**:391 (Apr. 10) 1957. Dolan, C. M.: California Med. **88**:443 (June) 1958.
IN ALCOHOLISM	Atarax "... is the tranquilizer of choice in the treatment of both acute and chronic stages, inpatient and outpatient, because of its safety, versatility, flexibility, and effectiveness." McGettigan, D. L.: In press.	Cohen, S.: Am. Pract. & Digest Treat. **8**:946 (June) 1957. Garber, R. C., Jr.: J. Florida M. A. **45**:549 (Nov.) 1958.

Dosage: One 25 mg. tablet or one tbsp. syrup q.i.d. For emotional emergencies, 25-50 mg. (1-12 cc.) I.M., 3-4 times daily q. 4 h. **Supplied:** Tiny 10 mg., 25 mg., and 100 mg. tablets. Syrup (10 mg. per tsp.), pint bottles. Parenteral Solution: 25 mg./cc. in 10 cc. multiple-dose vials; 50 mg./cc. in 2 cc. ampules. Prescription only.

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first in preference for relief from cough

quiets the cough and calms the patient

Expectorant
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Plain (without Codeine)

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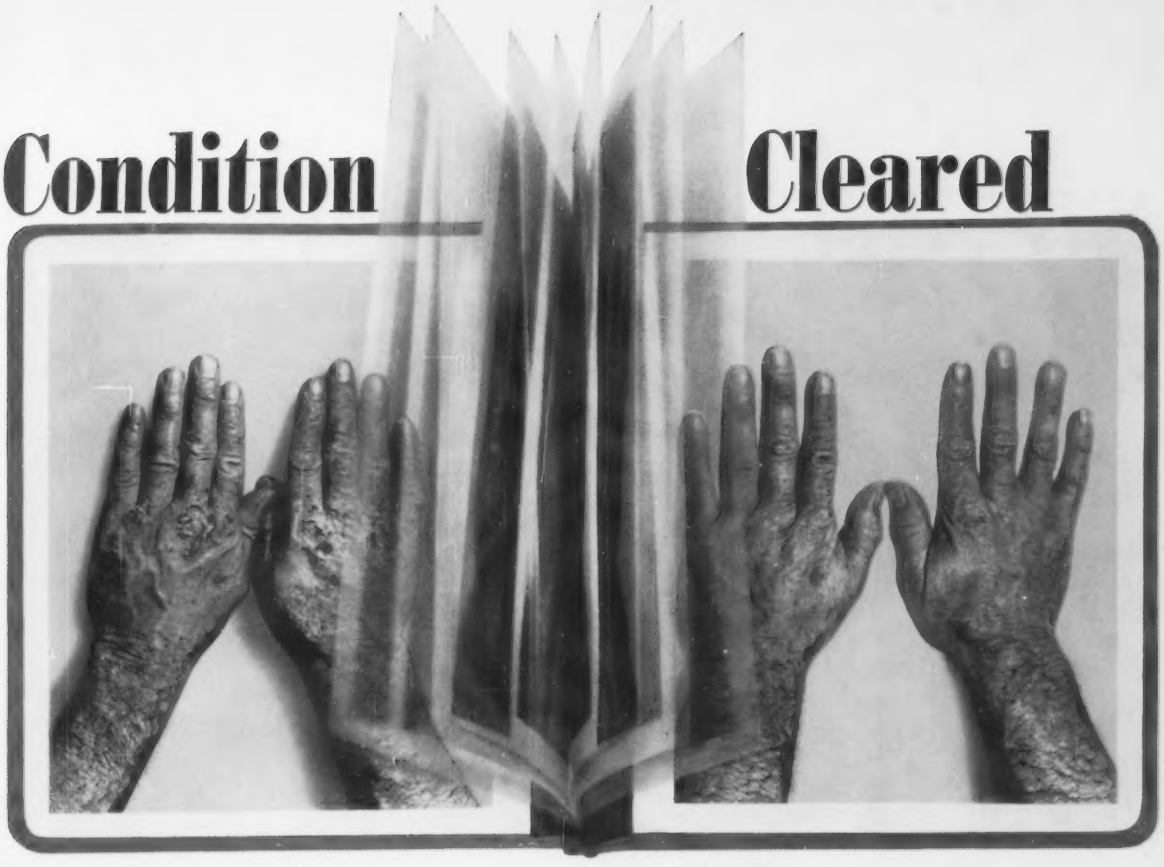

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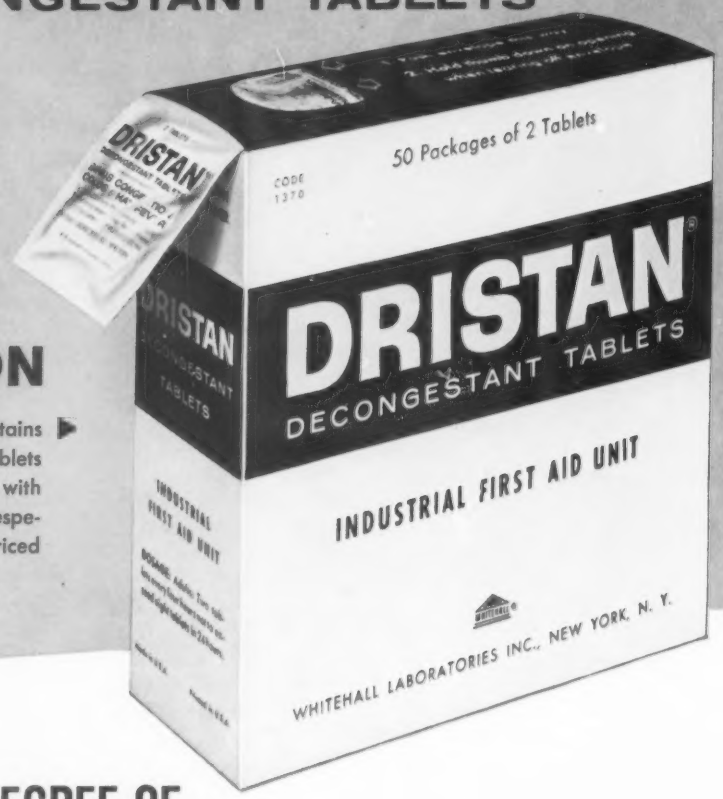

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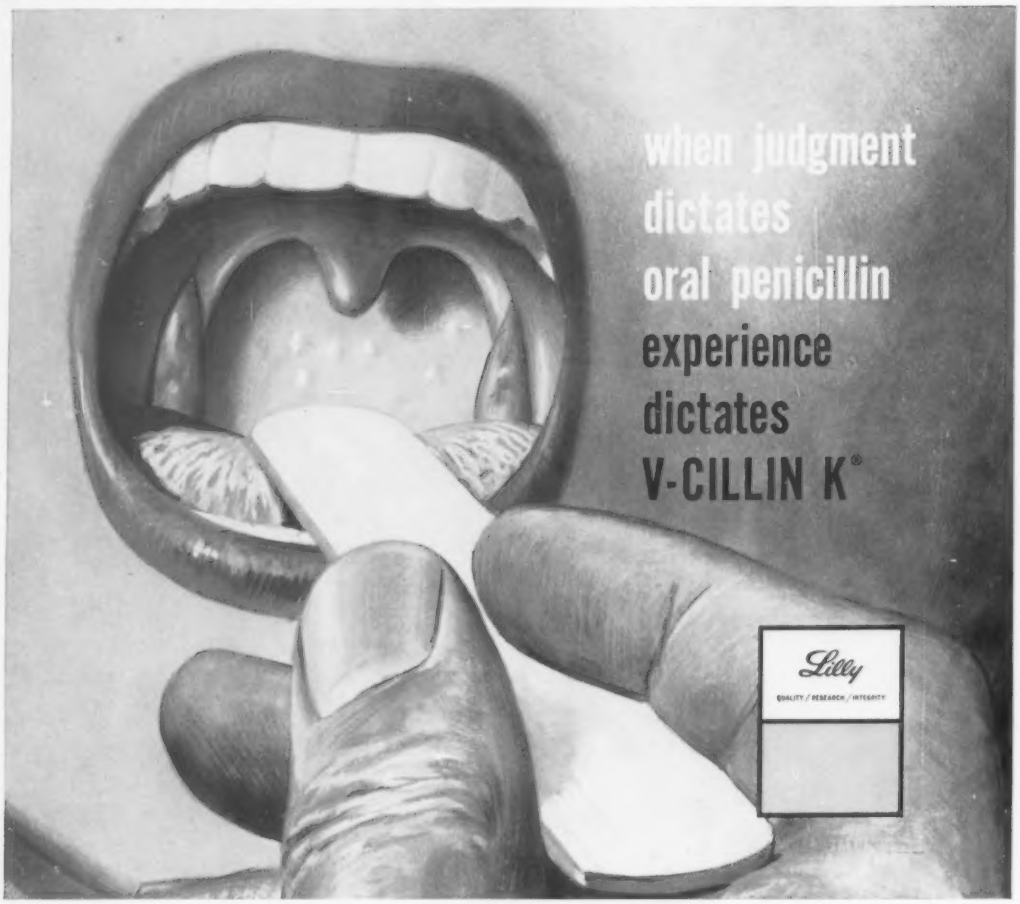

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PATHOGENESIS OF ATHEROSCLEROSIS

• MAXWELL G. BERRY, M.D.
Kansas City, Missouri

Arteriosclerosis is the cause of death in every human being who lives long enough. Arterial lesions which occur in aging, in diabetes, in hypertension, as well as so-called atherosclerosis, are fundamentally one disease and cannot arbitrarily be divided into separate and unrelated pathological processes.[1] When it occurs at an early age, with the vital coronary and cerebral arteries frequently affected by subintimal thickening, it is usually termed atherosclerosis or atheroma. In dealing with the pathogenesis of arteriosclerosis the problem is not one of finding "the cause" of atheroma but rather what makes it occur at the early age in which we see it so frequently.

The factors which have been considered to be "the cause" of atherosclerosis in our modern scientific thinking are actually not causes but accelerating factors in a process which develops steadily from the beginning of human life until its termination. This concept is consistent with the known facts and is a logical working hypothesis on which to base management of the disease as seen in patients. Much research, time and public money have been wasted on the once popular theory that atherosclerosis is unrelated to other arterial disease and that it is "caused" in some way by lipids.[2]

One American man out of every two is slated to die prematurely from atherosclerosis affecting his body in some place or another.[3] When we add to the victims who die those who are disabled prematurely from the same cause, atheroma is the most serious disease in America today. In American soldiers killed in Korea, at the average age of 22, a high percentage were found to have coronary atherosclerosis.[4] Autopsies on patients dying at the age of 50 revealed that in men 76% had at least Grade III atherosclerosis of the coronary vessels.[5] Ninety percent of all people dying at age 70 have advanced arteriosclerosis.[1] When patients reach the age of 90 or more the percentage who do *not* have hardening of the arteries to a severe degree is very small. Symptomatic atherosclerosis of the brain appears about five years later than that in the heart.[6]

Investigative effort in arteriosclerosis has been carried out on two fronts; the production of arterial lesions in animals and clinical research on patients known to be afflicted with the disease. Animal investigation has not as yet yielded any very useful information that could be applied to human arteriosclerosis and its problems. It has been particularly nonproductive in the past year or two. This is probably due to the fact that the basic concept of the specificity of atheroma and the relation of fats to arterial disease needs to be re-evaluated.

Neither has clinical investigation yielded any extremely useful information at the present time, although some interesting data has been obtained.[7] "Neither a decade of intensive study at the National Heart Institute nor the work of many private groups and individuals have contributed anything of established value in the clinical management of atherosclerosis."[1] Most investigators have been searching for a cause

of an arterial disease when actually they are dealing with a number of factors whch accelerate an aging process.

The known factors are: age, sex, body build, stress, hypertension, heredity, exercise, infection, diabetes, tobacco, obesity, diet, faulty lipid metabolism and hyperlipemia.

The effect of age is well established. The fact that women develop arteriosclerosis about 10 years later than men has led to a considerable amount of clinical investigation of the influence of the endocrine system on its development. We know that eunuchs develop atherosclerosis at the same age as women (later than uncastrated men), but that this occurs only if the individual has been castrated before puberty.[8] Castration after puberty has no influence on the ordinary male pattern of developing atherosclerosis. Administration of female hormone has been shown to prevent or to delay the development of experimental cholesterol arterial disease in animals. However, in human beings the administration of female hormones in clinically acceptable doses has no influence on the development or the course of atherosclerosis. A number of my patients with prostatic cancer have had coronary heart disease which has not been appreciably influenced by 30 mg of stilbesterol daily over a period of years. The undesirable feminizing effects of estrogens in this dosage prohibits its use except where it can be justified by some situation such as carcinoma of the prostate. Thyroid extract apparently has no virtue in treating atherosclerosis except possibly in those individuals who are myxedematous and in whom it is otherwise indicated. The effect in preventing or treating disease of the arteries even in these individuals is certainly not very striking.

Atherosclerosis apparently develops earlier in stocky individuals of the so-called "mesomorph" type.[9] The reason for this has not been elucidated.

Emotional stress affects smooth muscle tone and glandular secretion through specific neural pathways. Stress may increase the vulnerability of the blood vessels, raise blood pressure, elevate the blood cholesterol and other lipids, and accelerate blood clotting.[10] The tempo of our modern existence with its long hours of applied activity forces us into fatigue and leaves no time for recreation, exercise or emotional rehabilitation. One, however, must be extremely careful in evaluating stress. Sometimes a physician will create more stress if he artificially inhibits a patient's activity than the patient actually will have while engaging in a so-called "stressful endeavor." This is particularly true if the artificial limitation of activity results in a strongly motivated individual having to accept partial success. This is a common occurrence. Management of the successful American business or professional man with an excessive amount of drive requires much tact and human understanding and will vary considerably from one individual patient to another.

Heart attacks attributed to "hard work, selfless devotion to duty, and laudable ambition" may in reality be due to "physical indolence and gluttony."[11]

Hypertension has been called the most important factor in atherosclerosis. Moschcowitz[12] lists a number of reason for this statement, including: (1) the age of occurrence is lower and lesions intensified in hypertension, (2) the difference in occurrence in systematic and pulmonary arteries where the only important difference is the intra-arterial pressure; (3) the fact that pulmonary artery atherosclerosis develops with elevated pulmonary pressure as in mitral stenosis and "essential" pulmonary hypertension, (4) atherosclerosis is definitely less common and less severe in hypotensive individuals, (5) atherosclerotic lesions are intensified at points of resistance in the arteries. Moschcowitz states that "arteriosclerosis equals intravascular pressure times time." The most convincing part of this argument is the frequent finding of fatal atherosclerosis in the systemic arteries of an individual who has no atherosclerosis whatever in the pulmonary arteries; certainly no one can deny that the same lipids, the same stress, the same factors except for blood pressure, exist in the two systems of arteries. This certainly is a convincing argument against the theory that elevated blood lipids, stress, etc., produce atherosclerosis. (The fact that in my own series of eight cases of proved coronary heart disease in patients under 35 years of age only one had hypertension does not necessarily lessen the importance of this observation.)[13]

Hypertension can usually be controlled with safety. There is a double reward in prevention of the direct complications of hypertension as well as in almost certain delay of the development of arteriosclerosis which makes blood pressure reduction a most important achievement.

All observant clinicians have seen coronary artery disease and other atherosclerosis occur in several members of a family. There are non-sex-linked genetic components in familial hypercholesterolemia.[14] Probably the most important inherited factor in atherosclerosis, however, is the anatomic arterial variation which makes "stress points" in certain critical areas, particularly in the coronary arteries. Perhaps it would be well to survey periodically and carefully the various accelerating factors in individuals who come from a family known to have early clinical atherosclerosis.

Lack of exercise and the following of a sedentary occupation have been blamed for the early development and acceleration of atherosclerosis. Comparative groups of sedentary and nonsedentary workers were the objects of a study in England.[15] Aside from the fact that the sedentary workers died more frequently during an initial attack of myocardial infarction, there was no other difference in the two groups as far as incidence of coronary disease and severity of the attack was concerned. There are no definite effects in inhibiting or treating atherosclerosis which can be attributed to exercise alone.[16] Exercise should probably be encouraged in individuals who have no dyspnea or pain or other symptoms of heart dysfunction and who tolerate exercise in amounts which are compatible with their age and conditioning. Exercise may improve some function of the arteries which at this time we cannot accurately identify.

Infectious disease may initiate atherosclerosis and vasculitis. This is particularly true of typhoid fever, rheumatic fever and pyogenic infections. Virus diseases and collagen diseases seldom play a part in atherosclerosis. One is impressed, however, by the clinical fact that patients with febrile diseases in the age group in which atherosclerosis is commonly found will occasionally have acute myocardial infarction as a result of injudicious activities during the febrile period of acute infection.

Diabetes is a known accelerating factor in atherosclerotic vascular disease. This has been said to be associated with elevated blood cholesterol; however, my experience with diabetic patients shows no consistent correlation between the degree of atheroma and the level of the blood cholesterol. Possibly the vascular degenerative disease which these patients develop so frequently is due to repeated chemical injury to the vascular lining at pressure points by high levels of blood glucose. A diabetic person with advanced arteriosclerotic disease is much more apt to be one who has had poor diabetic control than one with a high blood cholesterol.[17] A double benefit is obtained by the proper and strict control of diabetes. One should, of course, treat patients with hypercholesterolemia in this group as he would patients with elevated blood lipids who do not have diabetes.

There is indisputable evidence linking tobacco smoking to increase incidence of coronary heart disease.[18,19,20] There is a significant difference in coronary death rates of heavy smokers as compared to nonsmokers. Tobacco smoking in this country is common; coronary heart disease is common. Studies of Bantus, Indians and wartime Scandinavians all show a low incidence of coronary heart disease where no tobacco is used. In my own male patients with acute myocardial infarcts 98% were heavy smokers compared with an incidence of 56% smokers among our total male patient population. The known universal effects of tobacco on the circulatory system — vascular constriction, elevation of blood pressure, acceleration of the pulse — repeated 20 or more times a day, 7,300 or more times a year for 20 or more years, could explain this association of tobacco with coronary artery disease. With the evidence at hand, smoking should be discouraged in all patients with arteriosclerotic heart and vascular disease. Most patients are grateful for the relief from this addiction, and there are no known serious harmful results from discontinuing tobacco.

Obesity has been shown by actuarial studies to be associated with an increase in early mortality from coronary heart disease.[21] It probably accelerates all arteriosclerosis. It does not produce the disease in very young men. One, however, does not need proof of the saying "there are not many fat, old men." Since it is one possible contributing factor in atheroma which can be controlled, this should be done in all patients who have arteriosclerotic disease, and certainly obesity should be corrected whenever possible. There is no scientific evidence that being excessively fat has any virtue at all, even on one's disposition.

The lipid nature of the arterial lesions in atheroma was the initial stimulus to the theory widely held today that excessive amounts of lipids may be responsible for atherosclerosis. Perhaps the process of arterial thickening and intimal hyperplasia is accelerated by abnormal amounts, abnormal types or abnormal handling of fats. Wood[22] lists the following points of evidence linking disturbance of the blood lipids to the development or acceleration of atherosclerosis:

(1) In the animal kingdom man alone suffers from atherosclerotic disease. The blood lipids are all higher in man than in other mammals.

(2) Only the newborn human infant is immune from atherosclerosis.

(3) Estrogens experimentally tend to restore the normal lipid pattern.

(4) All diseases known to be associated with altered (elevated) blood lipids are also associated with a high incidence of atherosclerosis.

(5) Atherosclerosis has been produced in animals (only) by means of a high cholesterol intake.

(6) The atheromatous lesions themselves contain a high proportion of cholesterol.

(7) Atherosclerosis is rare in people who live on a vegetarian diet low in fat.

In addition, there is a high proportion of fat

in the American diet. The Scandinavian war starvation was accompanied by a lower than usual rate of atherosclerotic heart disease; there is a high rate of atherosclerosis in American Negroes on a high pork diet; there is a low rate of atheroma in the Japanese on a native rice diet and a high rate of the same disease in the same people eating a high fat diet in America. Vitamin B_6 may be grossly deficient in our diet since it is inactivated by tracer quantities of chromium universally present in our water, and Vitamin B_6 apparently serves as a coenzyme in the metabolic cycle in which saturated fats are desaturated.

Investigation of the role of lipids in atheroma has involved study of the lesions in the diseased arterial wall, experimentally-produced disease resembling atheroma in animals, and the study of lipids and their metabolism in human beings. The initial lesion of atheroma in the human being does not contain any lipid at all.[23] There may be hemorrhage, fibrin and fragmentation, but initially no fat is present. Lipids, including cholesterol, are laid down later in the atheromatous lesion, but whether this lipid comes from the blood which circulates through the arteries or whether it is manufactured on the site by the artery is still undecided. Cholesterol can be synthesized by an isolated segment of arterial wall in the presence of no fat whatever. The exact chemical composition of the atheromatous lesion has not as yet been completely determined by any investigator.[24]

As previously stated, in the last few years experimentation with cholesterol-induced arterial disease in animals has seemed to be practically unproductive. It is to be hoped that in the near future the discovery of some new enzyme or metabolic cycle which can be effectively altered, thereby inhibiting some important phase of lipid deposition, may yield some more usable information for the clinician. The experimental work which has previously been done includes the development of arterial lesions resembling atheroma in rabbits, guinea pigs, hamsters, pigs and chickens by feeding large quantities of animal fat, and in dogs by pretreatment with thiouracil or previous production of hypertension and then the administration of large amounts of fat, or in monkeys by pyridoxine deficiency, or the lesions which are similar and can be produced in rats by a combination of high cholesterol diet plus high blood pressure plus thiouracil. These have been interesting observations and have afforded a means by which the effect of other agents, such as female sex hormones and thyroid extract can be evaluated experimentally, but their practical application has been very limited.

Patients who have hypercholesterolemia or excessive amounts of lipid in their blood may develop atherosclerosis sooner than patients who have normal blood lipids. In the clinical estimation of lipids in human beings many methods have been used, including the estimation of phospholipids and their relation to cholesterol, lipoprotein studies by the ultracentrifuge, and by electrophoresis and other means of separation.[25,26,27] The blood tryglycerides have been stated to be associated with coronary atherosclerosis.[28] The degree of saturation of fatty acids in the diet has been an interesting study. Many other aspects of this great investigative effort in the study of lipids are not mentioned here solely from lack of space. The total blood cholesterol estimation, however, is universally regarded as the best measurement of blood lipids.[29A and B] This is possibly true because of the early development of a reliable method of measure.[30]

Experience in my own practice with patients and their diets and blood lipids goes back to 1939.[31] From that date all new patients were subjected to two clinical studies. The first was the taking of a history as to the amount of milk, butter, eggs, gravy and fat meat in the diet of each new patient as he came to the office. After a survey of some 4,000 records this was abandoned because there was no apparent significant difference in the diet of the patients with coronary artery disease and those who had no vascular trouble at all. More recent efforts in this direction, however, have lead to the observation that a rather high percentage of the patients with acute myocardial infarction give a history of an abnormal ingestion of fat meat and/or butter, cream, gravy and milk. At the same date, 1939, we began to determine blood cholesterol levels routinely on all of our new patients. In 15,000 of these there is a sufficient amount of data to warrant study from a statistical point of view. Included in this group are the cholesterol levels of 200 consecutive patients with acute myocardial infarcts and controls from the group of patients of the same ages and sexes during the same years who had no overt vascular disease, hypothyroidism or other metabolic disease. The results are shown in the chart. There is evident only a moderate increase in the middle zones of cholesterol levels in the coronary patients as

Blood Cholesterol Levels in Acute Myocardial Infarction

Cholesterol Mg. %	100 to 150	150 to 200	200 to 250	250 to 300	300 to 350	350 and over
Controls	7.5%	43.6%	30.0%	11.3%	3.8%	3.8%
Infarcts	9.8%	34.5%	41.4%	11.2%	2.6%	2.6%

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compared with the controls. These are minor differences, as can be seen, and certainly discourage undue enthusiasm over the reported relation between blood cholesterols and other lipids and the early development of atherosclerosis.

There seems to be slight, though not striking, evidence from all of this data and from the quoted observations of others that there is an accelerating influence of lipids which in some way affects the pathogenesis of atherosclerosis. The most logical explanation seems to be that best expounded by Kinsell,[32] who believes the defect is in the excessive ingestion or faulty transport of saturated fatty acids. The transport of these saturated fatty acids in the human system is accomplished by their linkage to protein, to so-called "essential" oily fats, and probably also to cholesterol. It may be that cholesterol is elevated to a slight degree in patients who have atherosclerosis as a protective mechanism rather than as a harmful one. This certainly needs to be clarified.

Clinically it would appear that the restriction of total fat in the diet to about 30% of the caloric intake is justified and that unsaturated fats should probably be substituted for the "stiff" fats where possible. This, however, remains to be proved. None of the dietary measures or dietary supplements advocated to date have proved capable of causing the symptoms of angina pectoris to disappear.[33]

In the occasional patient who has hypercholesterolemia (and therefore probably hyperlipemia), with a blood cholesterol of over 300 mg percent, restriction of fat in the diet, reduction of weight and the administration of nicotinic acid is justified. Nicotinic acid can be successfully administered to most patients in doses of 2,000 mg to 3,000 mg a day,[34,35] and it certainly seems at present to be the best pharmaceutical means by which blood cholesterol levels and therefore blood lipids can safely be reduced.

"The etiology and epidemiology of atherosclerosis are completely unknown. It is important that the physician does not permit good judgment to be altered by undue emotionalism and competitiveness among investigators."[36]

Since arteriosclerosis is the ultimate destiny of every human being who lives long enough one should consider the various factors which have been discussed here not as the things which "cause" hardening of the arteries but as factors which accelerate the development of this hardening process.

It is quite probable that most of these factors play a part in the development of clinically significant arterial disease occurring far too soon in far too many American men.

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Response of the ARTERIOSCLEROTIC LIMB to Injury

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The vulnerability of the arteriosclerotic limb is obvious, but the factors which contribute to an aggravation of a fairly well compensated circulation are seldom, if ever, discussed. I shall briefly enumerate four factors which lead to a sudden worsening of the circulatory status of an arteriosclerotic limb.

It is assumed of course, that the injured person had performed his duties without obvious difficulty up to the date of the injury, that he or she sustained a documented injury and that following this injury, but not more than two to three weeks later, a demonstrable circulatory insufficiency is present. The presence of arteriosclerosis prior to injury can be ascertained by the history of claudication, angina pectoris or previous treatment for this condition. Flat films may reveal calcification; arteriograms revealing atheromatous plaques in the injured or uninjured extremity are good evidence that a pre-existing lesion is present (Figure 1).

There is no attempt here to discuss obvious arterial injuries to major vessels such as occur after gunshot wound, fractures and dislocations and which have been described elsewhere in detail;[1] nor is it necessary to dwell on the fact that the sclerotic vessel is brittle and inelastic. Rather, I would describe some factors which in my experience have led to sudden acceleration of the natural course of the disease.

Hemorrhage in the Atheroma

The late Professor Winternitz has shown cleared specimens of atheromas, indicating the increased vascularity of such a lesion.[2] The degenerative and proliferative changes in the vasa vasorum are significant for the vulnerability of the arteriosclerotic vessel, since the vasa may rupture when exposed to very little trauma or even spontaneously. The apoplexy of the atheroma then closes the vessel, which was previously narrowed by a plaque.

It is sufficiently known that an artery may be narrowed to 70% of its lumen before clinical symptoms occur. Thus, popliteal atheromas which are asymptomatic may suddenly close the lumen when hemorrhage and subsequent thrombosis occur. Unless patency is immediately restored, amputation will result (Figure 2).

The common iliac artery may become narrow or occluded as in the case of J. L., a 38 year old carpenter, who fell off a ladder and exhibited a large hematoma of the left flank and buttocks. Three weeks later he noticed pain in the lower back, buttocks and hip on the left side after walking. There was a palpable diminution of the left femoral pulse with an audible bruit. The aortogram (Figure 3) revealed plaques in the aorta and a badly deformed and narrowed left iliac artery. An endarterectomy relieved the iliac obstruction, but years later he suffered a femoropopliteal occlusion and two coronary occlusions. This man had severe progressive arteriosclerosis with a high blood cholesterol and the fall from the ladder simply accelerated a segmental occlusion.

Aneurysms of the thoracic aorta may develop after chest injuries and an instructive case of this sort was seen in a 56 year old school teacher, who suffered a steering wheel injury and exhibited a large aneurysm of the aortic arch (Figure 4). Two months prior to injury, a routine chest film showed no evidence of dilatation. This was neither a luetic nor dissecting aneurysm. The sclerotic wall with poor elastic and muscle fibers, simply gave way.

Injury to Collateral Blood Supply

A patient may have a short superficial femoral occlusion in Hunter's canal with short, sturdy collaterals bridging the gap (Figure 5). Such a patient may have a pulse at the ankle, although an oscillometer would show a slow, flat pulsewave. He may be aware of mild claudication. It

Figure 1

Femoral arteriogram of E.A., a 54 year old factory worker, showing multiple plaques causing stenosis along the course of the vessel. This is the uninjured, asymptomatic extremity of a patient who suffered an acute popliteal occlusion following a fractured patella.

takes little injury, such as a faulty strap on the operating table during sympathectomy, a traumatic approach to Hunter's canal for a bypass graft or a sudden fall resulting in defensive muscle contraction, to close the dominant collateral vessel, after which gangrene or at least severe ischemia result.

Since most injured patients would not have an arteriogram taken prior to injury, the only proof of pre-existing damage of this sort lies in the examination of the vessels during surgery or in the amputated specimen. The difference between an old occluded atheromatous segment and the fresh clot in the collateral is striking. Immediate endarterectomy or bypass graft saves the limb in about 50% of the cases.

This principle of injury to functioning collaterals is valid of course at other segments, such as around the ankle, where a warm, pulseless foot, depending for viability on a patent peroneal artery suddenly becomes cold and numb after a sprain, the single existing collateral being closed.

It operates in fingers and toes of patients who suffer from thromboangiitis obliterans or diabetes, where one digital artery is closed and the other one is traumatized.

The Effect of Hypotension on the Ischemic Limb

The arteriosclerotic or diabetic extremity with narrowed or closed vessels requires a certain head pressure and velocity of flow to maintain a viable limb. Sudden hypotension as a result of neurogenic or hemorrhagic shock will lead to thrombosis of collateral vessels by thrombosis of patent segments above or below the occluded segment. This occurs because a depleted blood volume fills the vessels poorly, and because of the tendency of cellular elements to agglutinate and form platelet and leucocytic aggregates when flow is retarded (Figure 6). When in addition such a vessel is directly injured, a perfect setting for thrombosis is present.

Capillary Fragility

Patients afflicted with hypertension and diabetes exhibit a capillary fragility which readily can be detected by a tourniquet test, in which

Figure 2

Arteriogram of R.S., a 55 year old executive, who had typical intermittent claudication after three blocks. After slipping on a staircase, the extremity suddenly became pale, cold and excruciatingly painful. The arteriogram taken a week later, showed sudden block at the upper end of Hunter's canal. Exploration of the popliteal fossa revealed an old atheroma with a superimposed fresh thrombus in the lower end of the femoral artery.

Figure 3

Aortogram of J.L., 38 year old carpenter, who fell from a ladder and sustained some bruising in the left flank. Within a week to 10 days, he complained of gluteal claudication. The lower end of the aorta shows a ragged contour, but the left common iliac artery shows marked deformity. His later course indicated progressive arteriosclerosis in other regions. The local injury accelerated the occlusion. He was asymptomatic before the injury.

Figure 4

Left oblique chest film of a 56 year old school teacher following a steering wheel injury. She produced a normal chest film taken two months prior to injury.

Figure 5

Note the atheromatous lesions above and below the short superficial femoral obstruction in Hunter's canal. There are a few short collaterals bridging the gap and a comparatively mild injury or hypotension can close them. Bypass grafts are equally vulnerable in such locations.

the blood-pressure cuff is held at a pressure midway between systolic and diastolic pressures for eight minutes. After release, the punctate hemorrhages are counted on the forearm in an area defined by the bell of a stethoscope. There are, naturally, many other causes for increased capillary fragility, notably the thrombocytopenic states, but our area of interest here is the vulnerability of the limb afflicted with vascular disease.

Especially, the diabetic toe will respond with an area of subcutaneous hemorrhage to as little as that of stubbing it. The black area, often regarded as a patch of gangrene, may be a hemorrhage, often arising more from the venous

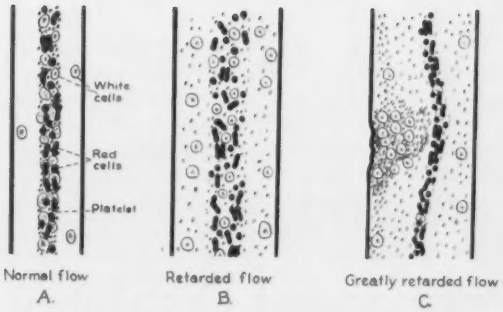

Figure 6

During normal flow (A), the marginal zone of the stream is mostly plasma, with only a few cells skimming the wall. In (B), depicting a retarded circulation, the axial stream consists mostly of red cells. Platelets and white cells have moved into the marginal zone. In (C), an almost complete standstill is shown. There is a bank of platelets in which cells are trapped. The axial current is slow and narrow. From DE TAKATS, G.: Vascular Surgery (Philadelphia: W. B. Saunders Company, 1959).

than the arterial or capillary sites. Diabetic angiopathy affects the venules in the form of microaneurysms not only in the retina and the kidney, but in the peripheral vessels in addition to the arteriosclerosis of the major vessels. Between the fibrous septa of the digits, a comparatively small hematoma may start pressure necrosis and gangrene, and, therefore, the hypertensive and the diabetic extremity is notoriously vulnerable.

The Neurovascular Lesion

This occurs in diabetics, tabetics, in patients with syringomyelia and less often, in arteriosclerotics. The sensory supply to the tips of toes or fingers is diminished or absent. A rusty nail will cause no pain when the patient steps on it. But there is a much more important reason why ulcers or gangrenous patches develop in areas which are subjected to trauma, such as the heel or metatarsal head. A protective axon-reflex which produces vasodilation after a sensory stimulus is not working because of the absence of sensory fibers (Figure 7). That this is the case, can be demonstrated by a cutaneous histamine flare, which can not be elicited in areas where sensory nerves have degenerated.

Summary

It seems from the discussion of the factors which aggravate peripheral arteriosclerosis after comparatively mild trauma, that many of the pre-existing lesions are latent and that they can only be brought out by a good history and an examination of the peripheral vascular status as a part of a pre-employment examination. Intermittent claudication, just as angina pectoris, is a particularly sensitive and valuable symptom of ischemia on exercise and should always call for a careful study. Such limbs are demonstrably vulnerable and critical ischemia may develop as a result of hemorrhage into atheromata, closure of functioning collaterals, acute hypotension and failure of protective vasodilator reflexes.

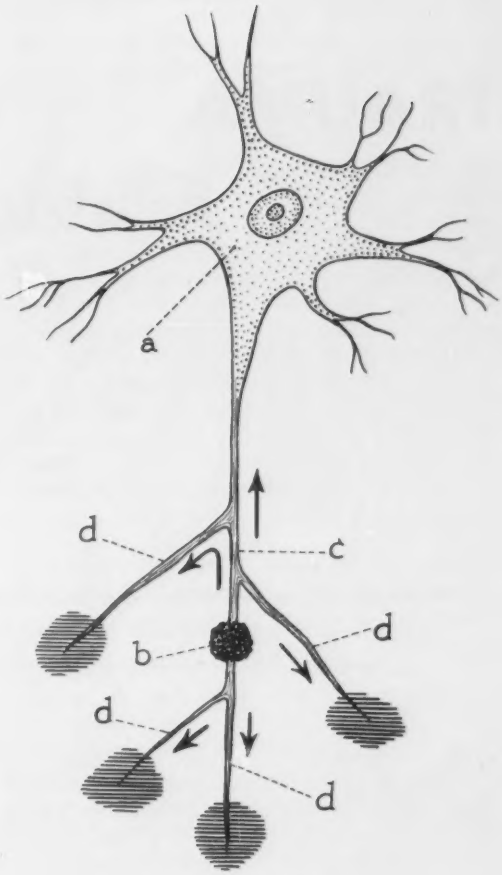

Figure 7

An axon reflex. (a) The ganglion cell; (b) the area of stimulation; (c) the sensory afferent fiber; (d) the efferent vasodilator fiber, producing a diffusible substance indicated by the shaded areas. Vasodilation following trauma will not occur if the sensory afferents are blocked. From DE TAKATS, G.: Vascular Surgery (Philadelphia: W. B. Saunders Company, 1959).

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TRAUMA, Rehabilitation, and Permanent Disability

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Cooperation between the employer and the surgeon is essential to establish rehabilitation measures in an industrial injury. The goal should be to return the patient to work as early as possible.

The development of progress and the enrichment of human life are accomplished through labor and its intelligent employment by capital. Usually the disabled laborer is a man of small capital. He is a liability of immediate importance to his own family and his employer. Prevention of permanent disability is of economic importance. The educational activities of modern safety engineering have made great progress but the incidence of disability from trauma, in general, seems always to increase. "Employ the physically handicapped" is a slogan widely heard today. Yet human errors, carelessness and thoughtlessness seem to defy the consequences of accidental trauma and lead to permanent incapacity.

The rate incidence of trauma follows the increase or decrease in hazards due to: (1) industrial machinery, (2) speed of transportation, (3) mechanized home and farm utilities, and (4) scientific warfare.

Railroad accidents during the early period of development were renowned for their frequency and their serious consequences. A railway surgeon was the leading practitioner of traumatic surgery. Now the speed of highway transportation has taken precedence. Home and farm accidents retain the highest frequency rate and what will happen in the rapid revolution of modern scientific warfare is pure speculation.

It is not generally recognized that the cost of accidental injury has become greatly absorbed by social and economic benefits provided by law or voluntary insurance. Disability claimed under the provision of the Industrial Compensation Statutes, liability insurance covering personal injury, pensions for War Veterans, Social Security, Welfare Benefits, Railroad Retirement Benefits, Vocational and Rehabilitation Provisions for the Handicapped, and innumerable forms of insurance for hospitalization and surgical care have created a tremendous impact on the practice of medicine. Probably 90% of the practice of the traumatic surgeon involves third party responsibility and the details of his medical management of the case is exposed to commendation or criticism of those other than the patient because of required reports he must fill out and sign.

A conscientious effort to avoid permanent disability must start with first-aid. Teamwork in trauma is rapidly becoming a surgical must in well organized hospitals. The team is headed by a Director Surgeon. Under his direction is a medical and surgical staff composed of an internist, an orthopedic surgeon, a chest surgeon, a neurosurgeon and a blood vessel surgeon. Nurses should be specially trained for such a team.

Delay in consultation or treatment is often serious. A case of multiple serious trauma may require the immediate skill of specialists in several fields of practice. As it is now in most hospitals, the patient is admitted on the Trauma Service corresponding to his apparent injury, such as the Orthopedic Service, the Chest Service, or the Neurological Service. The surgeon on call takes charge of the case and must take full responsibility to call others in for consultation. Many times there is great delay in consultation. A service organized on the basis of teamwork is set up for mutual cooperation and combined sharing of the responsibility on call or treatment.

The physical facilities and equipment of the emergency room must be especially designed for quick accessibility. Delay by admission formality should be avoided. X-ray equipment must be located to provide fast action. Medications and solutions for shock should be readily available and laboratory cross matching and blood typing should not be left to a routine schedule. A complete supply of emergency splints for fractures must be immediately available.

The recent experience in the Bayonne Hospital in caring for the railroad wreck victims when the trained plunged through a bridge into Newark Bay was a great demonstration of readily available organized teamwork.

Thorough preparation and repeated rehearsals in simulated disaster had recently been established so that on the occasion of the railroad emergency and mass disaster the administration, medical and nursing personnel were promptly at their posts of duty ready to cooperate when they were needed.

Some of the important measures for the emergency treatment of acute trauma are: (1) rapid transportation, (2) safe anesthesia, (3) quickly available intravenous solutions, (4) control of hemorrhage and shock, (5) blood vessel bank, (6) bone bank, and (7) improved internal fixation.

Fate chooses the time and place of a train wreck or an automobile accident. It may be far from adequate medical aid and hospital care. Rapid transportation is not always the life saving emergency that an ambulance service ought to be. Too often an automobile accident becomes just another headline obituary because of inadequate "on the spot" attention that could have saved a life. Surely there ought to be a way to overcome the reluctance to provide emergency blood transfusion, tourniquet application, and fracture splinting with ambulance service. During World War II many filling station attendants were trained and supplied with Red Cross emergency equipment. Such emergency requires public demand but the public remains unconcerned until mass disaster occurs and publicity on the shortcomings of emergency service creates criticism. Those responsible for Civil Defense will be caught in embarrassing criticism if some way is not found to arouse public interest in the development of better emergency service.

Anesthesia

Much credit should be given those who have developed the highly improved methods of anesthesia. The highly trained anesthetist can safely provide anesthesia under almost any condition of necessity. Quickly available intravenous solutions and whole blood transfusion are now so routinely used that they are taken for granted, but are most appreciated by those who had to treat emergencies without them. Now we could not do without the blood bank, or the blood vessel bank, and the bone bank. Internal fixation is of value in lessening permanent disability only where it is used judiciously and efficiently.

Shock

The more important points in the relief of shock are: (1) care of local wounds, (2) control of local hemorrhage, (3) transfusion, plasma, fluids, (4) relief of pain, (5) oxygen, (6) thorough temporary splinting of fractures, (7) appropriate medication, and (8) evaluation of lower extremities.

The management of shock should start at the scene of the accident. Of primary importance is care of local wounds and control of hemorrhage. The most effective relief of shock is the control of pain. Immediate temporary splinting of a fractured femur or other major bone should be accomplished even though there is nothing more available than a splintered fence post for the splint and the upholstering cloth of the car for bandages. Victims of highway collisions with severe fractures daily are madly rushed over miles of rough paving or through congested city traffic without any splinting at all. In addition the patient may lie for many precious moments on the hospital cart for a routine admission and service assignment. When the admission finally is accomplished, it is not uncommon for important surgical emergencies to be postponed because the patient is considered to be in shock. Here is where organized team work is important in trauma. Immediate consultation will decide the procedure.

The experienced traumatic surgeon will see beyond the urgency of the moment and realize the possibility of permanent disability in certain situations where there is postponement of surgical procedures due to fear and risk of producing further shock. A dislocated hip left unreduced more than 24 hours is likely to result in aseptic

necrosis. A compound fracture not debrided for 24 hours is very likely to produce suppuration with the disastrous results of bone sequestrae, nonunion and repeated operations. A ruptured popliteal artery may result in amputation.

From the industrial or liability point of view a complete diagnosis in every detail is important. The record should show all evidence of trauma from the smallest abrasion and contusion to the more severe injury. Likewise a careful history including all details of the accident is important. The past history should be carefully investigated in respect to previous injury or disease and residual pre-existing permanent disability.

Debridement

Thorough debridement of compound fractures is just as important today as it was before the introduction of antibiotics. The principles of debridement are: (1) thoroughness is essential, (2) control bleeding, (3) thorough surgical preparation, (4) conservative excision of skin and bone fragments, (5) copious cleansing solutions, and (6) drain one to 24 hours.

To be most effective, debridement should be done before six to eight hours following the injury. Late debridement may be done, but infection may be expected to follow. Fortunately, severe sepsis can be controlled, usually, by antibiotics. The wound should be made as dry as possible. Preoperative preparation should be just as meticulous as for any surgical procedure. Bone fragments should be removed sparingly. Removal of skin should be restricted to only the soiled edges and necrotic areas. Traction either in suspension or by use of external skeletal pins is preferable to internal fixation with but few exceptions.

Ambulation Vs. Bed Confinement

1. Early ambulation is preferable.
2. Open reduction is always difficult.
3. Time means little as compared to good union.
4. Good engineering preliminary to open reduction is important.
5. Anticipate later problems of rehabilitation.

Rehabilitation in the treatment of fractures must start in the beginning of management. Early ambulation with immobilization which permits joint function often saves weeks or months of overcoming stiffness and atrophy. Intramedullary pinning has contributed greatly to shortening the period of hospitalization. Other forms of internal fixation efficiently applied are of great advantage in well chosen cases, but, when poor judgment or inadequate material is used, prolonged hospitalization and other harmful effects may result.

Union is of first importance in the treatment of a fractured bone. Of what use is the fanciest form of screw or plate fixation if the fragments fail to unite? Many times the surgeon views the roentgenogram and feels that all that is needed is a screw or two. No open reduction is ever as simple an operation as anticipated. Failure thoroughly to analyze all the possibilities of failure of fixation may add extensive costs to the case and unjustified permanent disability.

Fracture Reduction

Some of the principles of fracture reduction are: (1) primary efficient splinting, (2) closed methods are preferable if open reduction offers little advantage, (3) avoid multiple manipulations, (4) avoid nerve or circulatory constriction, and (5) where open reduction is preferable, do not postpone.

Primary splinting of a fracture is often of great importance. Transportation of the case with no splinting or with poor immobilization may give rise to penetration of an artery or a nerve by a sharp fragment. Constriction of circulation by tight bandaging may produce ischemia and undue swelling. Closed reduction is more likely to result in union than open reduction but frequent manipulations to improve alignment can be very harmful. Judicious planning of management at the beginning of treatment will avoid the pitfalls of trial and error. Postponement of open reduction is a common fault. If thorough study of the case indicates that open reduction is the preferable method, it should be the primary treatment. Waiting several days or weeks to see if the fragments can be maintained in position through closed reduction is more likely to result in nonunion.

Indications for Closed Reduction

Closed reduction should be given first consideration in the treatment of fractures. However, there are certain areas in which open reduction is definitely indicated as the primary treatment, such as pinning of fractured hips and intramedullary nailing of a femoral shaft. Indications for closed reduction are: (1) closed reduction and plaster immobilization in Colles' and Pott's fractures, (2) fixed Kirschner wire traction in forearm, tibia and fibula, (3) suspension traction in the presence of shock or multiple severe trauma, and (4) traction in compound fractures.

Successful results from closed reduction may require more skill, ingenuity and patience than open reduction. Fractures about the ankle are now being opened and fixed with screws, but many times the surgeon is so overwhelmed with his "beautiful" job he fails to consider the unnecessary trauma of his gouging and levering

of fragments which destroys periosteal attachments and other callus producing tissue.

Open Reduction and Internal Fixation

Some of the indications for open reduction are: (1) long pointed fragments, (2) interposition of soft tissue, (3) fragments near a joint, (4) nerve or vessel damage, and (5) special situations such as the patella, hip, olecranon and condyles.

It is not an uncommon practice to try closed reduction first, and thereafter many manipulations before deciding on open reduction or plating. When the blood clot becomes organized and many manipulations have disturbed early repair, there is likely to be considerable delay in the physiological processes of union. Plates and screws have become well standarized so that there is no excuse for using imperfect metal. Vitallium is generally considered preferable but stainless steel can be depended upon when secured from a reliable surgical supply firm. It would seem elementary to mention the importance of selecting a plate long enough to prevent leverage of the fragments, to avoid distraction and to firmly seat no less than two screws in each fragment. Such errors, especially that of short inadequate plates and only one screw in a fragment, are still seen occasionally in orthopedic clinics where nonunion or malunion could have been avoided. Too many screws in a fracture near the ankle or elbow are often a detriment to motion. Furthermore there are too many malleolar fractures being fixed by screws. They seldom shorten the healing period and often must be removed. Before the rise of enthusiasm for internal screw fixation in malleolar fractures, nonunion of the malleoli was seldom a cause of disability.

Long pointed fractures fixed by two diverging screws is an excellent method of treatment. Interposition of soft tissue is especially harmful to union in fractures of the shaft of the humerus, femur and tibia. Open reduction in condylar fractures of the elbow in children of course is essential but this is not true of supracondylar fractures of the elbow in children. Where major vessel or nerve damage requires exploration open reduction of the fracture can be done at the same operation.

Rehabilitation and Permanent Disability

There are two periods when the industrial surgeon has an excellent opportunity to direct and prepare the injured man's mind toward the favorable or the unfavorable events of his progress in recovery and what to expect in regard to returning to work. One is at the beginning of treatment when the worst is feared, and the other when recovery of function requires voluntary effort to use the injured parts in order to mobilize joints and gain strength. It requires exceptional psychological skill and patient tolerance to deal with the emotionally apprehensive industrial patient. The surgeon who can stimulate "help yourself" interest in his patient will do more for his rehabilitation than the one who leans too greatly on physical therapy modalities. The most effective rehabilitation program is that of returning to work.

Unfortunately there are too many outside influences that prey on the mind of the injured employee about the time his doctor has advised him he can soon return to some kind of work. His employer is likely to say that there is no light work and that he can't go back on his old job until he can do it efficiently. He cannot secure a job from another employer, because either he does not know how to do any other work than the job to which he is accustomed or the employer will not hire him due to the existence of his claim for disability. This is particularly true of back injuries and is often responsible for overrated permanent disability. An early settlement without rehabilitation is often unfair to the patient and his family. I would, therefore, interject a plea here for more cooperation between the employer and the surgeon in establishing rehabilitation measures from beginning to end of the healing period of an industrial injury with the goal in mind of getting the man back to some kind of wage earning job at the earliest possible date.

In the management of post-traumatic neuroses, the physician must adapt his procedures to the patient's personality, but early return to work is generally good therapy and offers convincing proof to the patient that his anxious fears are unwarranted.

POST-TRAUMATIC NEUROSES

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The post-traumatic neuroses constitute one of the most common conditions encountered by the industrial physician and surgeon. Despite this, there is general misunderstanding of the nature of these conditions and consequently much confusion about how they should be diagnosed and treated.

At the outset it must be emphasized that the post-traumatic neuroses differ in no essential respect from any other neuroses. They are, as we shall see, simply neurotic episodes arising subsequent to some form of trauma. It will be essential, therefore, to attempt a simple description of the neuroses in general as an introduction to our consideration of those which follow trauma.

Types of Neurosis

In essence, there are two major types of the neuroses, although many varieties may be recognized by attention to detail. The first, and no doubt the most common type encountered, is the so-called *anxiety neurosis* which, in essence, is a tendency to suffer from an "alarm reaction" unwarranted by the actual situation. One remembers, of course, that the normal organism, when faced with a threat, exhibits increased activity of the autonomic nervous system, with an outpouring of adrenalin and sugar and a visceral reverberation characterized by tachycardia, palpitation, dyspnea, hyperventilation, tremulousness, weakness and excessive sweating and the psychological state of fear. The hyperventilation itself leads to important physiological phenomena including respiratory alkalosis, cyanosis and, in severe cases, tetany and even unconsciousness. These physiological reactions are normal when the environmental situation appropriately calls for them as a preparation for flight or resistance against attack. One must speak of a neurotic episode when the "alarm reaction" is inappropriate and seems to be evoked by an inadequate situation. It is important to keep in mind, however, that this reaction of anxiety, though inappropriate to the environment, is actually due to and appropriate to deeper and inner sources of fear. The "alarm reaction" in itself may lead to various kinds of structural damage to tissues through the mechanisms of arterial hypertension, gastric hyperchlorhydria and hyperperistalsis, to mention only a few. In this sense an anxiety neurosis may actually be a cause of physical disease.

The second general type of neurosis is *hysteria*, vastly different from the anxiety neurosis and based upon unconscious self-deception. It is important to remember that the hysterical patient

does not consciously attempt to deceive others, but indulges in self-deception as a defense against some difficult or even intolerable situation. The symptomatic phenomena of hysteria are of two types. In the first, "somatic" and usually quasineurologic symptoms are present, such as anesthesias, paralyses, or other apparently organic manifestations which correspond, however, not to the known facts of anatomy and physiology, but to the patient's conception of those facts. For example, an hysteric's anesthesia of a leg will take the form of a stocking and not follow the distribution of dermatomes or peripheral sensory nerves, since such an anesthesia involves a "leg" as understood by the patient. Likewise, an hysterical hemiplegia will involve motor and sensory functions on one side of the body in accord with the patient's idea of a "stroke," but will not correspond to the facts of neurologic anatomy. Thus, we may see a patient with a paralysis of the left side of the body, associated with the loss of sensation on that side, usually extending for an inch or more beyond the midline and sometimes associated with an apparent unilateral deafness and blindness on the left. Such a syndrome, of course, is anatomically impossible and its spurious quality immediately is evident to the physician.

A characteristic feature in hysteria with such somatic manifestations is the benign and even good humored lack of concern which the patient exhibits toward his difficulties. Charcot described this feature as *la belle indifference* of the hysteric. Such a patient, suffering from what would seem to be most distressing disturbances, may smile pleasantly at the physician and exhibit no concern, often presenting in his behavior an attitude of passive defiance as if to say, "Cure me, doctor, if you can." The diagnosis between hysteria with such somatic features and malingering is extremely difficult, and specific rules cannot be laid down for the distinction. The reason, of course, is that while the malingerer consciously attempts deception, the hysteric actually deceives himself first and others only secondarily. The mere demonstration of the spurious quality of hysterical symptoms is not an adequate proof of willful deception. To diagnose malingering would, therefore, necessarily require proof of conscious deception, which, of course, is rarely possible.

In the second type of hysterical phenomena the patient exhibits psychological rather than somatic symptoms. These take the form of various obsessions, compulsions, phobias and other psychological states. Such cases belong to the so-called obsessive-compulsive neurosis, called by some anxiety hysteria and, by others, psychasthenia according to an older terminology. Such psychological forms of hysteria, when severe, approach very nearly indeed to schizophrenia and may, in individual cases, be indistinguishable from it. Like schizophrenia, they are extremely resistant to any form of therapy.

These two conditions, anxiety neurosis and hysteria, are sometimes seen in combination in which the patient may present somatic symptoms mixed with a great deal of anxiety, often about the prognosis as to his health, his ability to work and even his life.

With these features in mind, it is obvious that a neurosis must be recognized by its characteristic symptomatology and not merely by the careful exclusion of organic disease. It is quite illogical, of course, to assume that our methods of clinical and laboratory study, no matter how refined, exhaust all possibility of disease. Complete negativity thus proves nothing, while the presence of the indisputable features of neurosis requires that neurosis be diagnosed even in the presence of organic disease. Furthermore, no physician is justified in diagnosing a neurosis unless the patient presents the characteristic features of that condition.

The Nature of Neurosis

In view of many common misconceptions of what a neurosis is, it seems appropriate to discuss its intimate nature in order to understand what sort of processes underly it. Let us first say what a neurosis is not, and then attempt to discern what manner of thing it is. *A neurosis is not a disease* by any acceptable criteria. For example, unlike a disease, it is not due to tissue damage, although it may itself damage tissues eventually. Again, it has no specific cause such as infection, trauma or toxic state. Finally, unlike a disease, it has no invariable course such as one sees in the processes of pneumonia or the healing of fractures or the course of a malignancy.

Second, *a neurosis is not malingering*, as explained above, although it resembles malingering to the superficial observer, and its distinction from malingering may be all but impossible. Third, *a neurosis is not a form of wickedness* or stubborn contrariety. A close professional friend of mine often says in referring a patient to me, "This patient is not neurotic; she is a very nice person," as if "nice" people were never neurotic. As a matter of fact, the contrary is more often true, since a "nice" person is a well controlled, often rigid individual who makes efforts to please and hides his own selfishness and unpleasant traits. Such rigid self-control may betoken inner conflicts which often lead to neurotic manifestations, while a completely uninhibited, "normal" individual is often an unpleasant person.

If, then, a neurosis is none of all these things, what can be said about what it actually is? *A neurosis is a kind of behavior, a character-structure, a way of life.* It is an habitual way of meeting problems, as learned in childhood. Under the impact of experience in the earliest portions of life, some of us learn to be cowards and others to be courageous; some learn to be lazy and others diligent; some learn to tell the truth conscientiously and as if by inescapable preference, while others tell big and little lies, even to ourselves, to avoid unpleasant circumstances. A neurosis, therefore, is a kind of personality which, fortunately modifiable in childhood, becomes so firmly established in adult life as to be essentially unmodifiable. One does not teach an old dog new tricks with ease and one does not easily unmake an adult neurotic. To clarify this point, the neurotic personality may be compared to other types of character structure which are more immediately obvious. For example, a "dyed in the wool" Republican rarely becomes a Democrat during his mature years; a person who has firmly established the habit of being a realist scarcely ever becomes a mystic after reaching adult life; a thoroughly self-permissive and self-seeking individual rarely changes to become an unselfish and well-disciplined person after maturity. On the other hand, such a well-ordered individual may, under the impact of a disease like general paresis or a cortical degeneration, suffer a decay of his character into all degrees of slackness and permissiveness.

If a neurosis is an established way of life, it is evident that specific neurotic syndromes which have a beginning and an end are only episodes, neurotic episodes, in such a life. A neurotic episode is a brief chapter in a long book; it is a specific manifestation during temporary circumstances in the neurotic person's existence. A neurotic episode arises as the response of the neurotic personality to a predicament of some kind, and the predicament determines the origin, as its duration determines the length of the episode. In the course of life a neurotic individual experiences many such neurotic episodes, each of the same type but each varying from the others in detail. The symptoms of a neurotic episode may be expected to disappear when the predicament which evoked them has been "solved." Thus neurotic patients may seem to be "cured" in that their symptoms may disappear after a time when there is no further occasion for them. The true cure of a neurotic would involve the basic alteration of his character, and is a utopian ideal scarcely to be achieved. True, our friends, the psychoanalysts, seem to think that their procedures sometimes accomplish so basic a cure after years of effort. However, after years of experience, I hope I may be forgiven some skepticism about such basic cures as a result of any form of psychotherapy.

It is important for the physician to realize that the neurotic person is thoroughly convinced of the reality and importance of his predicament, and defends his position with vigor. Insofar as his neurotic episode may represent a sort of solution of his dilemma, he does not actually wish to be cured, although he would surely like to be relieved of his distresses. In short, he would like to be rid of his unpleasant symptoms but does not wish to face his problems realistically, outside the framework of his neurotic reaction.

Post-Traumatic Neurosis

From what has been said, it is obvious that a neurotic syndrome appearing after an injury is actually a post-traumatic episode which occurs in the life of an individual whose character structure is neurotic. Such a "post-traumatic neurosis" is certainly not due to structural damage of tissue by the particular trauma. Hence, it is misleading to speak of a "traumatic neurosis"; it is proper only to speak of a "post-traumatic neurosis," or, better still, of a "post-traumatic neurotic episode." We realize now that the unique personality capable of suffering such a neurotic episode existed before the trauma occurred, and that the trauma constituted only a single agent in a complex predicament which precipitated a neurotic episode in a person uniquely prone to such a reaction. Furthermore, the single traumatic occurrence becomes the precipitating agent only in the whole setting of the patient's life situation. The threat imposed by any trauma is determined by the whole personal, social and economic situation of the patient, his domestic relationships to his wife and children and other relatives, his status with respect to his employer and the degree of economic security which he enjoyed at the time he was hurt. For example, to a self-reliant, confident and happy man, the respected head of an affectionate family, who has been able to achieve economic security, a broken leg means something vastly different from what it means to an habitually anxious, self-doubting and harried husband and father, who has little self-reliance and less economic security. Many a workman, born in a foreign country, making an adjustment with laborious difficulty and never seeming to achieve much in the way of victory, whose children appear better adapted to our society than does he, may find a relatively minor injury to be at once a grievous threat and a convenient justification in his domestic conflicts, perhaps even an actual boon to his harried ego. Thus trauma, perhaps in itself insignificant, may in such settings as those described, excuse

failure, justify weakness, promise retaliation against a feared and perhaps hated employer, and, under modern workmen's compensation laws, suggest the possibility of some measure of personal victory. The important concept, it seems to me, is that the neurotic episode follows a traumatic occurrence only in an individual with a certain type of neurotic character structure and in a predisposing environmental setting.

Perhaps one may generalize enough to say that an episode of anxiety neurosis occurs in the habitually fearful person, while an episode of hysteria is observed in the habitually hostile and devious person. I have some doubts about the occurrence of episodes of the compulsive-obsessive form of hysteria after trauma. Certainly this type of disturbance is rarely seen as a sequel to injury.

Management of the Post-Traumatic Episode

In the light of these considerations, it is clear that the treatment of individuals with post-traumatic neurotic states resolves itself into a management of the episode and not into an attempt to modify the neurotic personality. We shall have done our best when we have restored the patient to his previous state of well-being without attempting so radical a "cure" as his transformation into a different kind of person. Certain relatively obvious rules of procedure are highly important in the management of the neurotic episode.

(1) The physician must in all cases protect the patient's ego against injury and degradation, inasmuch as it is damage to his ego that has produced his symptoms. One dare not become impatient with such persons; subtle understanding and finesse are indispensable, just as skillful maneuvering rather than blind force is needed to untwist a difficult wire puzzle. Obviously we must avoid all hostility, we must earn the patient's confidence through our sympathy and insight, and we must show a measure of busy activity in treatment. Such a patient will never be restored to normality through a "brush off" or through flat statements that there is nothing wrong with him.

(2) Physiotherapeutic and other procedures for which logically there may be no actual physical justification are therefore highly important psychotherapeutic measures. For example, infrared heat or massage or whirlpool baths or electrical stimulation may serve a most useful purpose in restoring an hysterically paralyzed or anesthetic extremity. Such measures, however, are effective only when the personal, social and economic predicament of the patient is "ripe" for solution. Stated in other words, such measures succeed when the patient is ready to get well and no longer "needs" his symptoms for the alleviation of his personal dilemma. Therefore, the physician must make every effort to help his patient solve his personal dilemma; this may be accomplished in part by supporting the patient's ego and restoring to him some measure of self-reliance. Inevitably this means a careful and friendly inquiry into the conditions of the patient's life so that the physician may understand how best to approach the solution of his problems. It is obvious that such intimate personal therapy cannot be carried out by others under the physician's delegation. No physiotherapist can substitute for the doctor himself.

(3) Therefore, the physician must adapt his methods and procedures to the patient's individual personality. No two persons have exactly the same needs, or can be treated in exactly the same fashion. Hence broad generalizations are not possible. However, it is certainly advisable to reassure the anxiety neurotic, if in such reassurance we carefully avoid the hint that "Your troubles amount to nothing." The hysteric, on the other hand, poses a much more difficult problem; his restoration is best achieved by according him some measure of victory and justification. The compensation awarded thus assumes a therapeutic role and is not merely a cold legal adjudication between employee and employer. It is highly desirable to avoid protracted payments until recovery is achieved, since such payments in effect reward the patient for remaining ill. The "neurotic episode" must, if at all possible, be terminated by the award of compensation.

(4) As a rule, an early return to work is highly desirable but may meet with the patient's vigorous resistance insofar as his illness "solves" his neurotic dilemma. To return to self-supporting work is good therapy and offers convincing proof to the patient that his anxious fears are, after all, unwarranted.

(5) All such methods require much time, careful study of the individual patient, and unlimited tact on the part of the physician, not only toward the patient but also toward the attorneys for the company and for the plaintiff. With careful individualization of each case and the willingness on the part of the physician to work diligently and to preserve his equanimity and good will, these most obstinate of clinical syndromes may often be overcome with great satisfaction not only to the doctor but to the patient and to the employer.

Role of the NECK in HEAD PAIN

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Medical cultists for many years have been treating and relieving some patients with head discomfort by directing their attention to the neck. It is time medical doctors paid more attention to the neck.

In the belief that neck pathology has been insufficiently emphasized as a cause of head pain, I propose to review some of the experimental and theoretical material concerning stimulation of the neck structures with referral of pain to the head, and the effect upon the neck muscles of chronic head pain, as well as the role of the upper cervical nerve roots in neck and head pain.

Such a review should aid in placing our clinical thinking upon a firm base, so that we can more intelligently analyze those patients we see who complain of headache.

Interest in this has been stimulated by recent descriptions of so-called whiplash injuries to the neck, and in the recommendation for cervical rhizotomy as a treatment for certain types of headaches.

The discussion will be confined largely to upper cervical and suboccipital pain. The pain is aggravated by certain positions of the head and neck, as in forced forward flexion of the head onto the chest, especially with the face toward the affected side. The head may be carried in a forward position, so that a plumbline dropped from the mastoid process will fall in front of the midpoint of the shoulder; and physical effort in the forward bending position, as in typing and microscopy, aggravates the discomfort. The pain may radiate forward of the cervico-occipital area, even into the distribution of the trigeminal nerve, and may simulate "migraine." The patient may have a stiff neck with limited motion, or complaint of a "crick in the neck."

This type of neck and head pain is given many clinical labels. These include occipital neuralgia or neuritis, neck sprain or strain, whiplash injury, occipito-cervical neuralgia, hemicrania, the cervical syndrome, the second cervical root syndrome, cervical myofascitis, fibrositis, myositis, and cervical discogenetic disease, to mention a few.

It is necessary to separate those patients who have a history of injury to the head and neck, usually from whiplash violence, from the nontraumatic group. In the present state of our knowledge, we can analyze the problems of the traumatic group, and expect a desirable response to a therapeutic regime including procaine injections of alogenic areas; neck-stretching along with heat, massage, and neck exercises; and occasionally, surgical section of occipital nerves and posterior cervical nerve roots. We tread upon less certain ground in attempting to analyze and treat the nontraumatic group, as it is here that the unwary physician is caught in the trap of not recognizing a psychosomatic ill for what it is.

In 1943, Simons, Day, Goodell and Wolff[1] described experiments on human subjects, where sustained contractions of the muscles of the scalp and neck were described as sources of head pain. Their approach to the problem consisted

mainly of measuring electric muscle potentials from the frontal, temporal, and posterior cervical muscles. They found that continuous pain in the head, as from repeated injections of hypertonic saline into the temporal muscle, or from the application of a head-screw apparatus, would cause marked posterior cervical muscle contraction with pain in the neck, and that the sustained neck muscle spasm itself would be responsible for occipitocervical pain. This is a kind of vicious circle mechanism which makes it difficult for the clinician to separate cause from effect in head and neck pain. In addition to such mechanisms of referred pains this group suggested that "even strong contraction of the muscles of the neck is often below the level of ordinary awareness and yet gives rise to dysesthesia of the scalp, probably by traction on the galea, and to tenderness in the neck muscles."

These authors noted, and I believe this is worthy of special emphasis, that emotional tension, as anxiety, could cause continuous neck muscle contractions, and hence suboccipital discomfort, and "represents one of the major problems confronting the medical profession." They then speculate that "in some instances, the muscle contraction may be symbolic of withdrawing the head from a noxious agent or of stabilizing the head on the shoulders for a charge against the threat." To continue their speculation, perhaps there can be found some biological meaning to the circumstances that the neck muscles, which consciously and voluntarily hold erect the head, become involved first in catatonia, in emotional tension, and in response to noxious agents about the head. To say that someone or something is a pain in the neck, is a common lay expression, readily appreciated by all as meaning intolerable or disagreeable.

Campbell and Parsons, in 1944,[2] called attention to the phenomenon of referred head pain and its concomitants. They observed and recorded experiments on 40 subjects, using hypertonic salt injections as pain stimuli; and in a few experiments used procaine injections to relieve cervico-occipital pain patterns.

In general, they found that stimulation of the deep areas of the posterior neck region was capable of causing pain to be referred into the scalp, beyond the ordinarily accepted anatomical boundary of the occipital nerves, and that the more rostral the level of stimulation, the more cephalic the distribution of the pain produced.

In 1944, Davis,[3] an orthopedic surgeon, reviewed 134 cases of injuries to the cervical spine, to conclude that the majority of these injuries were in the nature of a "whiplash." He emphasized the difficulty of accurate diagnosis in the group of cases which he described as obscure, where the fact of injury to the neck, recent or remote, trivial or violent, is not accorded significance by the patient or physician. Davis also described the value of taking additional lateral x-ray projections of the cervical spine, in extreme flexion and hyperextension, in order to reveal subluxations.

In 1948, Raney and Raney,[4] called attention to headaches as a common symptom of cervical disc lesions, and stressed that many patients complain of headache, when in reality the source of discomfort is in the neck. In 1949, in association with Hunter,[5] they further elaborated upon this theme.

In 1949, Ruth Jackson,[6] another orthopedist, reported on 400 cases of cervical injury with cervical nerve root irritation, and she described "the cervical syndrome" which is well recognized in subsequent orthopedic literature. She speaks of stiffness and pain in the neck associated with migraine-like occipital headaches, aggravated by certain positions of the head and neck. Ninety percent of her patients with occipital headaches showed subluxations of vertebrae C-2 on 3, while 10% showed subluxations of vertebrae C3 on 4.

In 1949, Hunter and Mayfield[7] wrote of the role of the upper cervical nerve roots in the production of pain in the head, and described the "second cervical root syndrome." The anatomical basis for their conception was detailed, and is pertinent enough to our present discussion to be paraphrased.

The articulations of the atlas and axis vary from the remainder of the movable spine so that the first and second cervical nerve roots are not protected posteriorly by pedicles and facets which elsewhere in the vertebral column complete the root canal. Their ganglia do not occupy foramina, but lie upon the vertebral arches. The posterior primary ramus of the nerve C-2 gains access to the soft tissues of the neck after passing between the posterior arches of the atlas and axis. Because the bony atlantoid-axial articulations are highly movable, the primary rami of C-2 are subject to unusual stress, even under ordinary circumstances.

The posterior primary ramus of C-2 eventuates in the scalp as the greater occipital nerve. It is this peculiar vulnerability of C-2 to trauma which these authors consider to be the basis for the production of head pain from neck pathology.

The second cervical root syndrome is described as a post-traumatic hemicephalgia, with recurring bouts of severe pain, initiated in the suboccipital area with radiation forward into the head, and many times with the associated phenomena of a vascular cephalgia. There is tenderness over the course of the greater occipital

nerve, and the pain is brought on or aggravated by the neck maneuvers of hyperextension and rotation of the occiput to the painful side. Sensory loss is present in the scalp dermatome of C-2 (the greater occipital nerve), and deep procaine infiltration of the C-2 root or the greater occipital nerve in the scalp interrupts a pain attack. Eleven patients were treated by the authors, eight of whom had a traumatic history, and three without trauma. Relief was obtained in the traumatic group only, when they were treated by avulsion of the greater occipital nerve, intraspinal section of the sensory root of C-2, or section of the sensory roots of C-2 and 3. In a personal communication to me, dated August, 1953, Doctor Mayfield stated, "Our ideas have changed only slightly since this article was done. However, we are coming to recognize that lesions in the midcervical area also account for head pains in many instances." After studying similar pain problems Finlayson[8] concluded that the C-3 root is more important than C-2, in this form of pain referral.

In 1953, Gay and Abbott[9] described common whiplash injuries of the neck, in a series of 50 patients. This graphic term (I believe that the phrase whiplash injury of the neck was first used by Arthur G. Davis in about 1945) means essentially a sprain of the neck, consisting of pain in the cervical spine, limitation of motion of the neck, and spasm and tenderness of the cervical spinal musculature. The inertia and greater weight of the human body may be thought to represent the handle of a whip, with the lighter head being flicked on the shaft of the cervical spine. Complications of the whiplash injury included cervical radiculitis, protruded cervical and lumbar intervertebral discs, cerebral concussion, and psychoneurosis. Also, as with sprains elsewhere in the body, continued unprotected use of the joints with their traumatized ligaments may produce a syndrome of chronic pain. Conservative treatment of these patients was recommended, and there is no mention of cervical rhizotomoy performed for pain relief.

Most of us see patients with head and neck pains, and evaluation of any individual case problem is many times difficult. Low cervical discs and foraminal syndromes are fairly characteristic in their anatomical radicular patterns, usually implicating the dermatomes and myotomes of the cervical roots six and seven. High cervical radicular patterns, especially those associated with sprains of the neck and involving the cervical roots of two and three, are perhaps not as well understood, and it is with the hope of throwing some light upon the subject that this paper is presented. Treatment of the high cervical radicular case, with distribution of pain into the head, should be primarily conservative, in my opinion. Physiotherapy to the neck, including neck stretching, and procaine injections of the occipital nerves as indicated, should take place first. Perhaps there will be an occasional patient, who in spite of conservative treatment, continues to have his cervico-occipital pain, and who may fit Mayfield's description of the second cervical root syndrome, and who may require intradural section of C-2 and/or C-3. Such patients will be in the minority, however. It would appear that a history of injury to the neck is important, as the best results from treatment directed to the neck have been obtained in the traumatic group.

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Management of

FOREARM FRACTURES

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Accurate reduction of fractures of the forearm in children is desirable but not as essential as in the adult because of the molding effect with growth as stated in Wolf's Law. Overriding of the fragments and even various degrees of angulation may be accepted. The younger the child, the more spontaneous and faster the correction will take place with growth.

Most fractures of the forearm in children without overriding of the fragments may be reduced without anesthesia by slow, gentle traction, followed by a sudden manipulation in the direction of over-correction (Figure 1). Many children are given general anesthetics and the parents subjected to much additional expense unnecessary in the management of these forearm fractures. Certainly, the circulation of the fingers should be observed carefully for the first few days. The greatest extent of swelling usually is in the second 24 hours, postfracture.

Wedging of the cast should be used more frequently to correct significant degrees of angulation which remain after casting (Figure 2). It is best done four to five days after the cast has been applied, when swelling has subsided. Anesthesia is not necessary, but a barbiturate may be given a few hours previous to the wedging procedure.

Fracture of the distal two inches of the radius and ulna with dorsal displacement and overriding of the radial fragments is a difficult problem. It requires general anesthesia with strong traction and special manipulation by increasing the deformity in order to allow the volar edge of the distal fragment to slide by the dorsal corner of the proximal fragment. If reduction is achieved, it is usually quite stable, but the wrist should be flexed in the cast in a position of over-correction (Figure 3). Fractures of the forearm in children should be immobilized in a long arm cast, from the upper arm to the flexion crease in the palm from six to 10 weeks depending on the location of the fracture and the age of the patient. After age 13 they should be treated as fractures in the adult. Open reduction of fractures of the forearm in children is rarely indicated. Much unnecessary and even detrimental open surgery has been done in the past, and is only mentioned at this time to be condemned.

Fractures of the shaft of the forearm bones in the adult are often difficult to manage and they frequently require open reduction. Accurate reduction is essential in obtaining good function of the elbow and wrist joints and especially pronation-supination motion of the forearm. The ulna is fixed more solidly to the humerus and does not rotate, while the radial head readily rotates in relation to the humerus as well as to the proximal portion of the ulna. The radius is more fixed in relation to the wrist joint and swings around the distal portion of the ulna on pronation motion of the forearm. Thus, when necessary, the radial head or the ulnar styloid area may be excised without very much effect on the stability of forearm function.

Under proper conditions, overriding of the fragments is an indication for open reduction. However, in the face of poor skin, ulcers, or severe contamination of compound wounds (Figure 4), some type of closed method is preferred. A simple method of reduction is to have the patient lying in a supine position, with the finger traction device pulling toward the ceiling. Traction is produced by gravity as well as pressure of the surgeon's foot through a bandage sling on the arm above the flexed elbow. This allows the surgeon to use both hands for reduction of the fracture fragments and application of a long arm cast with the elbow flexed at 90° (Figure 5). Pressure of the cast on the arm maintains counter traction; the forearm portion should be well molded to keep the radius and ulna apart. Skeletal traction, using a Kirschner wire through

Figure 1
Fractured radius and ulna in an 8 year old boy; closed manipulation and cast — no anesthetic.

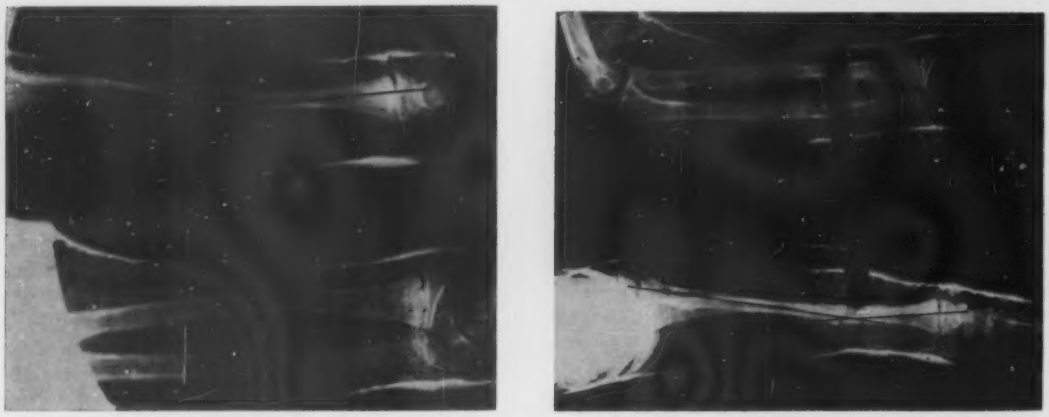


Figure 2
A 13 year old boy with manipulation and cast elsewhere; wedging of cast done 5 days post fracture.

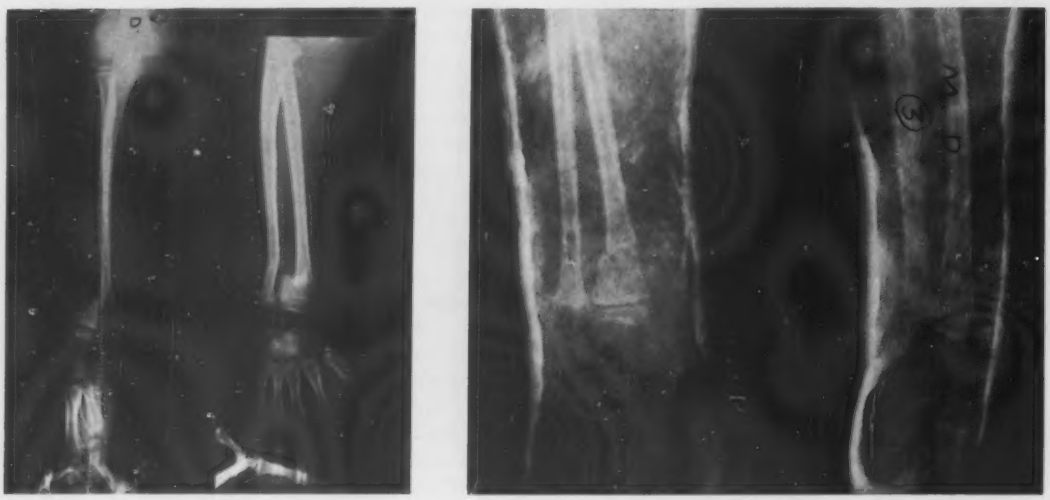


Figure 3
A 6 year old boy with a fracture of distal radius and ulna with overriding; general anesthesia with closed reduction and cast.

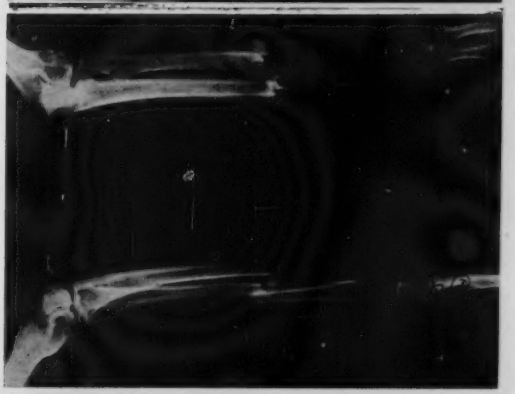
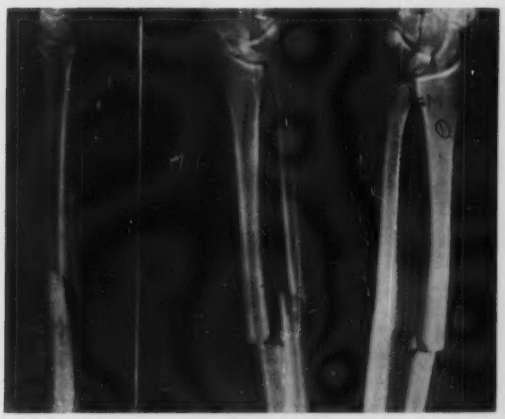
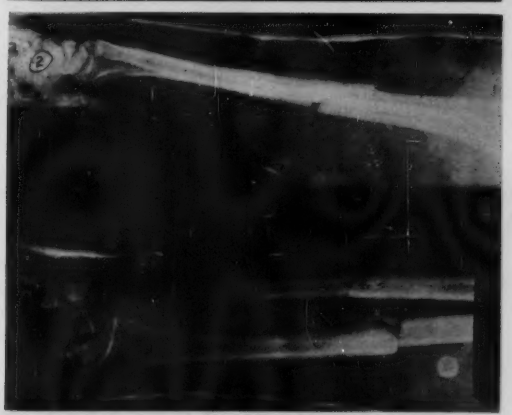


Figure 4

A 38 year old man who sustained a severe dirty compound fracture of the ulna when he was thrown off a horse. There was sand filling the medullary canal of the proximal ulna for one inch; surgical cleansing of the wound was done mechanically as well as profuse irrigation with normal saline. Internal fixation was contra indicated. Cast fixation was utilized.





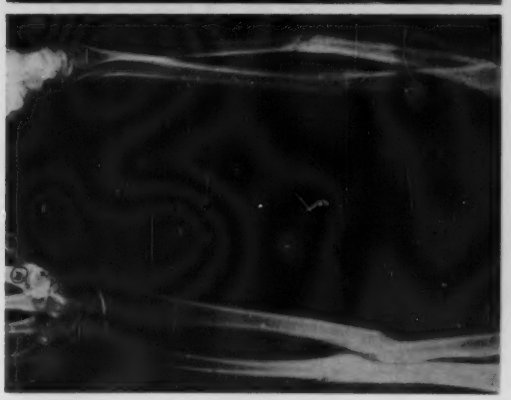


Figure 5

Both bone fracture in a college football player; immediate closed reduction and cast with no anesthesia; but demoral analgesia was given.

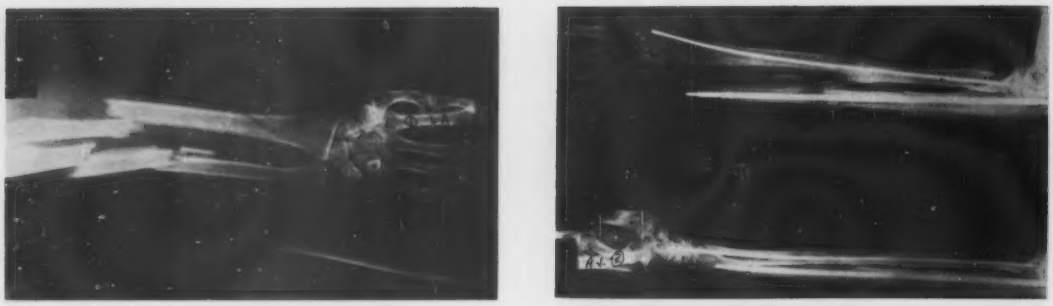


Figure 6
An elderly woman with multiple fractures of legs and upper extremities; open reduction with intramedullary nail fixation of radius and ulna; no external cast fixation used.

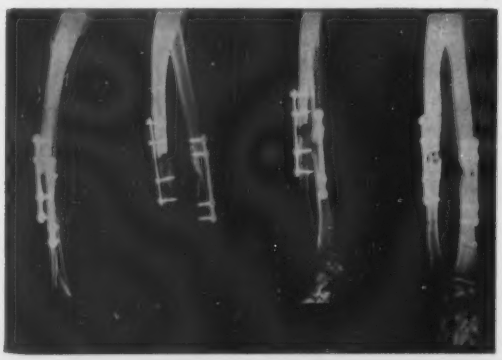


Figure 7
Open reduction with Sherman plate internal fixation of radius and ulna; nonunion of the ulna is obvious.

Figure 8
A 40 year old man with multiple fractures of one leg and both upper extremities. Open reduction with intramedullary nail internal fixation; no cast.

the metacarpals may be used for traction, or be transfixed in the plaster to maintain position of reduction. It is very important to take recheck x-rays one and two weeks postreductive; if loss of position occurs, wedging of the cast or open reduction may be necessary. Usually, four to six months of plaster fixation is necessary; nonunion is frequently caused by injudicious cast changes.

During the past few years, intramedullary nail fixation of the radius and ulna have become the internal fixation of choice (Figure 6). Longitudinal muscle tone tends to produce contact-compression at the fracture site, because the bones may slide down the nail. Likewise, there is no external mechanical block to interfere with rotary motion. Sherman plate type internal fixation holds the fragments apart as absorption of bone at the fracture line occurs and results in too many cases of nonunion (Figure 7). Sliding type plates theoretically allow contact, but are not much better. Likewise, any type of threaded pins or fixation device which does not allow contact-compression to occur at the fracture line

will result in prolonged healing time, or nonunion.

We favor the use of the self-cutting four-flanged type of medullary nail because it gives maximum strength for its weight as well as prevention of rotation of the fragments. The self-cutting teeth simplify the technique; the nail acts as the cutting instrument as well as the fixation device with a perfect fit. The 3 mm size nail is used for the radius and can easily be bent to conform to the curves of the radius. They must be inserted at the radial styloid into the medullary canal. The 4 mm and 5 mm sizes are used for the ulna and give more rigid fixation. It is most important to use some type of rotation-preventing type of fixation for the ulna. The nails are inserted retrograde at the fracture site and driven out through the olecranon process; and after the fracture is reduced and held with a clamp, the nail is driven down into the distal fragment. The addition of bone grafts are recommended if there is any loss of bone substance, and usually will insure union.

Fracture of the shaft of the radius or ulna alone is a special circumstance, particularly if it is transverse, and the prognosis for healing is more guarded. Open reduction with intramedullary nailing and bone grafting is the preferred treatment.

The use of a long-arm plaster cast with the elbow at 90° and extending out into the hand to prevent rotation of the forearm is recommended for three to five months. However in certain circumstances, such as multiple fractures involving both upper extremities, external plaster fixation may be omitted if the internal fixation is demonstrated to be solid at surgery. I have six cases of various types of fractures of the forearm in which no external fixation was used, with excellent healing and much happier and more comfortable patients who were able to care for themselves (Figures 6 and 8).

Open reduction should only be attempted by one skilled in the use of adequate equipment to do the job right. The use of an effective tourniquet is essential.

Overlooked Ulcer

The ulcer, often considered a socially acceptable ailment, is really a significant economic problem in the United States, according to a RAND Corporation study just published. Its author, Irwin S. Blumenthal, Ph.D. of the RAND research staff, undertook the project to determine the size of the ulcer problem and to find out how much research was being conducted on gastrointestinal ulcers.

While the social "badge of honor" that accompanies an ulcer case may help ease the victim's plight, it is possible that this casual attitude has hindered research on what may be a serious problem. The study estimates that every year nearly 3,000,000 people in the U. S. get ulcers and that 200,000 of these people are disabled for more than a week. The incidence rate of ulcers among American adults may be as high as 34 out of every 1,000; men seem to be two and one-half times more susceptible than women. Ten thousand deaths a year are ascribed to ulcers. All this results in an economic cost amounting to over $500,000,000 a year, measured in terms of loss of income from total disability, costs of medical care for the disabled, and estimated loss of income due to early deaths. Blumenthal says, however, that less than $5,000,000 a year is spent for research on gastrointestinal disorders. This is less than 1% of the economic loss to the nation because of these diseases.

Ulcerative disorders are diseases that almost everybody thinks are caused by psychological factors — nervous tension, personality make-up and deeper emotional conflicts. But Blumenthal found little agreement among authorities in the field about definitive psychological causes. He feels that both psychological and physiological factors must be understood better before ulcers can be cured.

The study points out that ulcerative disorders are part of a group of chronic diseases which generally are not "cured" but merely "controlled" by diet and continuing medical care to prevent recurrences. The basic causative factors for ulcers have not been discovered, and possibilities for absolute prevention of the ailment do not exist.

While relatively little money is being spent for research in the general field of gastrointestinal diseases, the amount increased during the 1950's. Between 1951 and 1956, $677,882 had been appropriated by Congress for this purpose. But for the year following President Eisenhower's attack of ileitis, Congress appropriated $500,000 and directed that the National Institutes of Health's Institute for Arthritic and Metabolic Diseases enter the field of research on gastrointestinal problems. Other investigations in ulcerative disorders are being conducted at a few large medical centers with endowed funds. There is, however, no national fund-raising organization, such as the National Tuberculosis Association or the Muscular Dystrophy Association, that finances research in the entire field of gastrointestinal diseases.

FACTORS INFLUENCING INTERMITTENT CLAUDICATION

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In treating cases of intermittent claudication, the whole patient must be studied and treated; diagnostic procedures and treatment cannot be limited only to the peripheral vascular system of the legs.

Since this presentation is based mainly on personal studies on the subject of intermittent claudication, the writer feels it important to make a few prefatory remarks concerning the present general interest in the subject, his personal interest, and to give credit to those who have contributed technically and financially to the development of the new methods of study and results which form the basis of this report.

There has been an intense interest in the subject of intermittent claudication for many years, and it is of particular interest today because of new methods of study, new methods of treatment, and because of the apparent increased prevalence of this condition associated with increased longevity.

The writer has had a continuing interest for the past 30 years in the general subject of the arterial circulation and associated phenomena, such as the precise recording of the arterial circulation anywhere in the extremities, the temporal arteries, and the intraorbital tissues; the precise recording of the arterial blood pressures in all four extremities; and the recording of the arterial diastolic blood pressures in the temporal arteries and the brain.

With the development of the project with its many facets, aid of various kinds had to be enlisted from technicians, physicists, physiologists and financial contributors. For this aid I am grateful and wish to give credit.

Clinical Features of Intermittent Claudication

When discussing a subject such as this, it is probably good to begin with a definition, and I have chosen the one given in *Dorland's Medical Dictionary*.[1] "Intermittent claudication is a complex of symptoms characterized by absence of pain or discomfort in a limb when at rest, the commencement of pain, tension and weakness after walking is begun, intensification of the condition until walking becomes impossible, and disappearance of symptoms after a period of rest."

There are a number of associated features as follows: (1) the character of the pain is usually described by the patient as a cramp, but it has been noted by numerous investigators that the affected muscles are flaccid; (2) the cause of the pain is not yet known, but it is thought to be due to an ischemia of the muscles leading to a metabolic substances known as P factor,[2] but this has

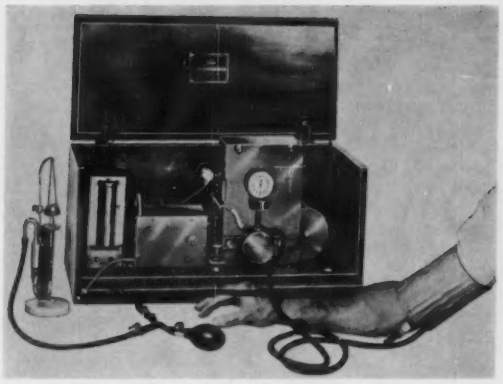

Figure 1
This photograph illustrates the manner of recording the diastolic blood pressure, and the arterial circulation above the elbow in the arm.

not been proved; (3) the walking tolerance is roughly related to the degree of occlusion; (4) there are a number of occlusive arterial diseases with which intermittent claudication is associated, but atherosclerosis obliterans is the most common cause; (5) clinically it occurs almost exclusively in the legs, but it has been produced experimentally in the arms.[2]

Methods of Study

This presentation is limited to an analysis of studies of intermittent claudication of 41 patients with atherosclerosis obliterans with, or without, an associated diabetes mellitus.

The following examinations were made: (1) routine studies of a detailed history, physical examination, blood counts and urine examination, blood sugar, N.P.N. and uric acid; (2) lateral x-rays of the abdomen for the abdominal aorta, and A.P. and lateral x-rays of the legs for soft tissues; (3) recordings of the arterial circulation at five levels, mainly: above the elbows, at the wrists, above the knees, below the knees, and at the ankles; (4) recordings of the arterial blood pressures above the elbows and above the knees; (5) an electrocardiogram; (6) special studies of the feet, shoes, B.M.R., etc. where indicated; (6) all studies on the arterial circulation were made in the reclining position to avoid the effects of gravity.

The arterial studies were made with the Johnson Recording Oscillometer.[3] The method of recording the diastolic blood pressure and the arterial circulation is illustrated in Figure 1. The method of recording the systolic blood pressure is illustrated in Figure 2. The arterial circulation at the five levels listed above is recorded in ml per heart beat or per minute — these are accurate to 0.02 ml per beat.

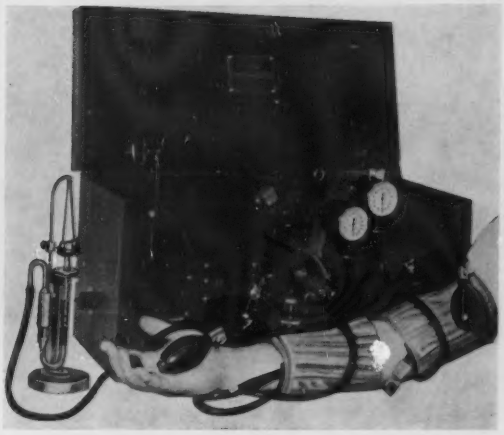

Figure 2
This illustration shows the method of recording the systolic blood pressure of the arm. The details can be obtained from the monograph[3] on the subject.

Results

The effects of some of the factors influencing intermittent claudication are best illustrated by case reports as follows:

The critical level of the arterial circulation at the ankle necessary to maintain life of the tissues has been found to be approximately 4 ml of blood per minute. Case Report: The patient was a white female, aged 72 with a long history of uncontrolled diabetes mellitus, intermittent claudication on walking a quarter block, and rest pains. Recordings of the arterial circulation at the ankles was 12 ml per minute on the right and 5 ml per minute on the left. A fasting blood sugar was 190 and x-rays showed extensive calcium deposits in the terminal aorta. The patient was advised as to the critical nature of her illness, but could not accept medical care because of her religious beliefs, but only needed a diagnosis to obtain more effective prayer by her practitioner. Gangrene of the left leg set in within two months and amputation was done above the knee. It was felt that the leg could have been saved by medical management outlined in succeeding cases.

The arterial circulation during the pain of intermittent claudication; Case Report: Mr. B, a white male, aged 63 gave a history of a sudden onset of intermittent claudication in the right leg in November, 1953, and came under my care in September, 1954. There were no symptoms in the left leg. The patient had no other complaints and the physical examination was negative except that the right femoral, popliteal, posterior tibial, and dorsalis arteries were not palpable. The blood pressure in the right arm was 110/84. X-rays for the abdominal aorta showed calcium

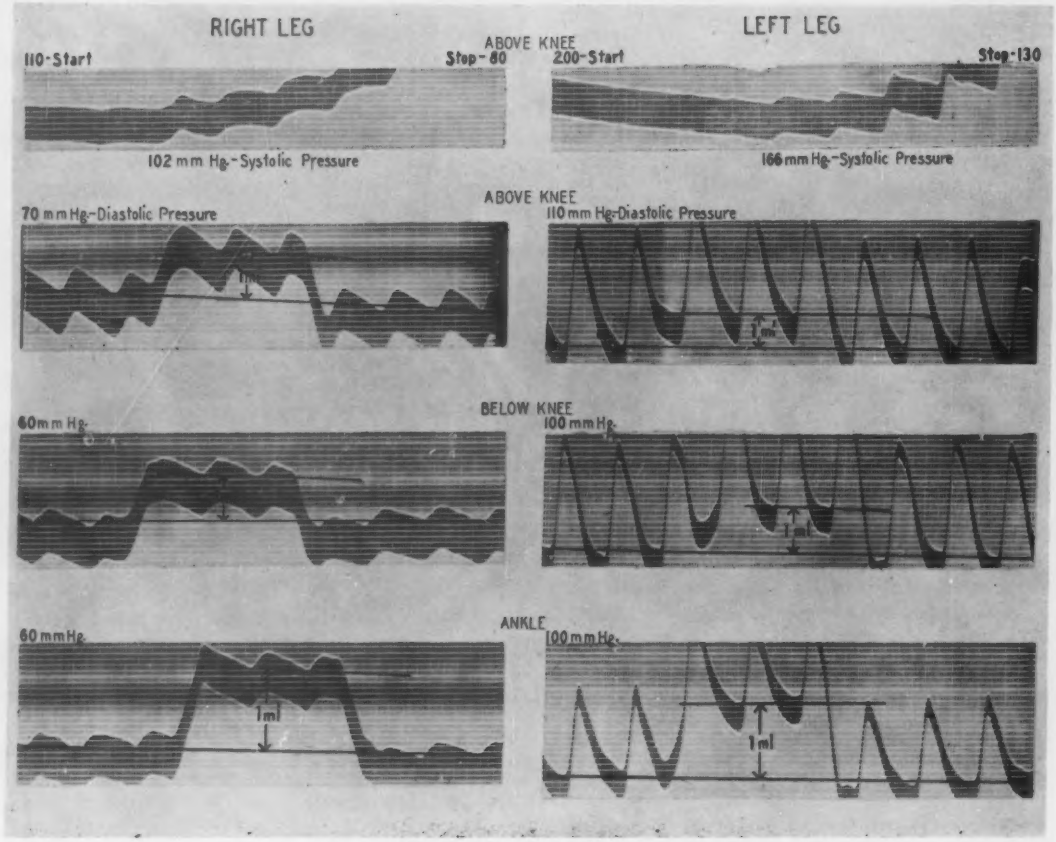

Figure 3

The upper section shows recordings of the systolic blood pressure in the legs. Note the hypotension in the right leg associated with occlusive arterial disease. The lower recordings were taken at the diastolic pressure above the knee, below the knee, and at the ankle.

Correct Arterial Volume Pulse Expressed in milliliters

	Diastolic pressure	Heart rate	Crest time	K	Pulse vol. change
		RIGHT LEG			
Above knee	70 mm Hg	75	0.28	1.32	42.0
Below knee	60	75	0.28	1.32	26.0
At ankle	60	75	0.28	1.32	17.7
		LEFT LEG			
Above knee	110	75	0.16	0.92	258.0
Below knee	100	75	0.16	0.92	168.0
At ankle	100	75	0.16	0.92	82.5

The difference between the legs is very apparent. The prolonged crest times and the decreased minute arterial circulation are characteristic. This patient was chosen for illustration since he had a normal leg to compare with one with occlusive arterial disease.

deposits extending into both common iliac arteries. Recordings of the arterial blood pressure and arterial circulation at various levels in both legs are illustrated in Figure 3. These show: (1) a normal blood pressure in the left leg and a low blood pressure in the right; (2) a normal arterial circulation at all levels in the left leg and a markedly reduced arterial circulation at all levels in the right leg. This study illustrates: (1) a marked lowering of the arterial systolic and diastolic blood pressure in the right leg distal to the arterial occlusion; (2) a normal blood pressure in the left leg; (3) a higher blood pressure in the normal left leg than in the arms which is a normal finding in adults even in the reclining position. Note: (1) the arterial blood

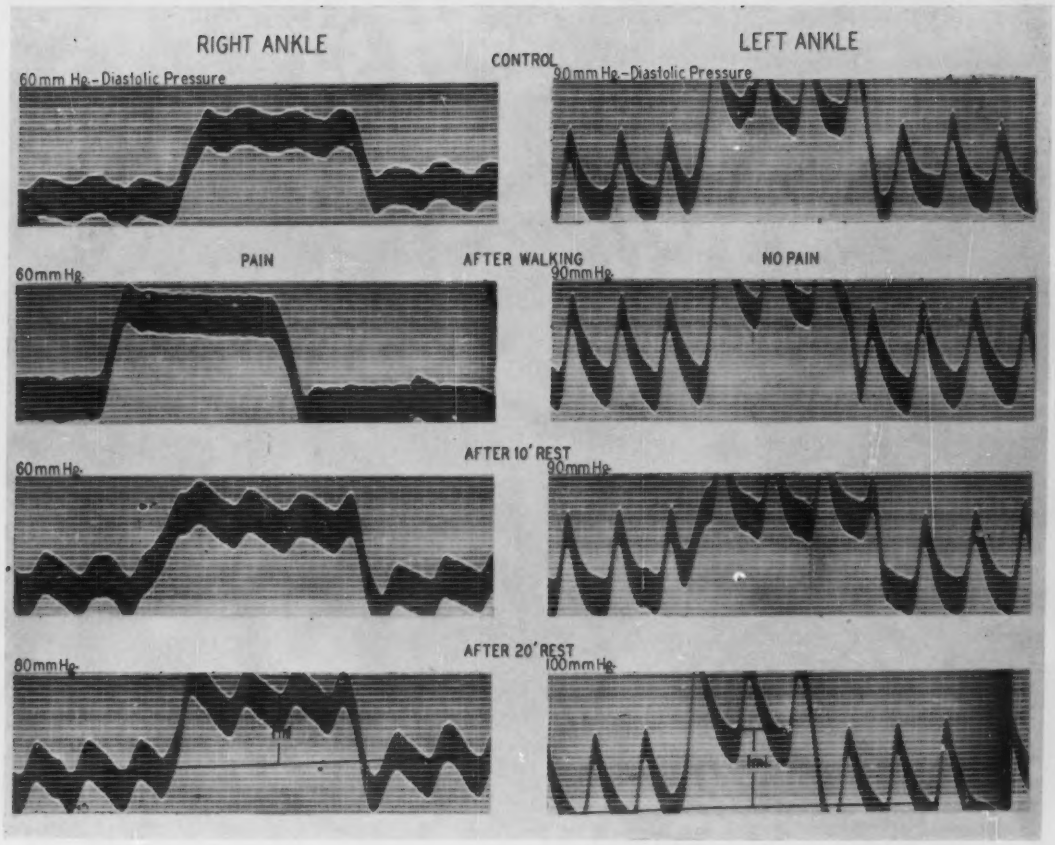

Figure 4

This figure illustrates the effects of the pain of intermittent claudication on the corrected minute arterial volume pulses, and the effects of 10 and 20 min. rest after the pain.

Corrected Minute Arterial Volume Pulses Expressed as ml.

	Diastolic pressure	Heart rate	Crest time	K	Pulse vol. change
		RIGHT ANKLE			
Control	60 mm Hg	75	0.28	1.32	17.9 ml
During pain	Not measurable				0.0
After 10 min. rest	60	75	0.28	1.32	34.2
After 20 min. rest	80	75	0.28	1.32	47.5
		LEFT ANKLE			
Control	90	75	0.16	0.92	92.0
No pain	90	75	0.16	0.92	71.2
After 10 min. rest	90	75	0.16	0.92	63.2
After 20 min. rest	100	75	0.16	0.92	71.2

Note the complete absence of a measurable volume pulse during the pain of intermittent claudication. Also, the reactive hyperemia following a 10 and 20 min. rest period after the pain.

pressure and arterial circulation distal to an arterial occlusion has been lower than normal in 41 other similar cases; (2) calcium deposits in an artery found by x-ray is not indicative of the degree of patency.

The pain of intermittent claudication: The effects of the pain of intermittent claudication on the arterial circulation and the arterial diastolic blood pressure are illustrated in Figure 4. One notes that during the pain of intermittent claudication recordings of the arterial circulation made at the ankle indicates a virtual cessation of circulation. Following a 20 minute rest period there is a marked reactive hyperemia. An additional observation was that during the pain of intermittent claudication in the right calf, as

has been noted by others, the muscles were flaccid. This study would indicate that walking for patients with occlusive arterial disease should be beneficial.

The effects of lowering arterial blood pressure in the presence of occlusive arterial disease on the symptoms of intermittent claudication; Case Report: Miss H, white female, aged 54, came under my observation in January, 1959, with a history of severe intermittent claudication, rest pains, inability to concentrate, and memory loss. She gave a history of a systolic blood pressure of 240 mm Hg in September, 1958, for which she was given antihypertensive drugs. The arterial circulation and arterial blood pressures were recorded in both arms and legs with the following results:

ARTERIAL BLOOD PRESSURES

	Right		Left	
date	elbow	knee	elbow	knee
1-19-59	150/80	81/70	161/90	96/80
	MEDICATION DISCONTINUED			
8-8-59	160/100	124/100	180/100	146/110
% increase — systolic		41%		52%

ARTERIAL CIRCULATION AT ANKLES — ml PER MINUTE

	Right Ankle	Left Ankle
1-19-59	30 ml	38 ml
	MEDICATION DISCONTINUED	
8-8-59	32 ml	44 ml
% increase	15%	16%

The patient is now free of rest pain and intermittent claudication. This case report illustrates that antihypertensive drugs should not be used in patients with a real or relative hypotension of the legs with the associated occlusive arterial disease, and, also, that blood pressure as well as impaired arterial circulation plays a major role.

Disturbances of metabolism: It is a well-known clinical fact that disturbances of metabolism have a profound effect on the cardiovascular system. Case Report: Mrs. D, white female, aged 70, was first seen on October 10, 1958, because of symptoms of intermittent claudication on walking one block. The history revealed that she had a thyroid operation 32 years ago following which she has been taking varying doses of thyroid extract. Examination revealed a moderate impairment of the arterial circulation to the legs as well as moderate calcium deposits in the distal aorta. Excessive doses of thyroid extract impaired the circulation by the production of frequent premature ventricular contractions, while inadequate doses impaired the circulation due to a thyroid insufficiency. The most effective dose of thyroid extract was found to be two and one-half grains daily and with massage she has marked relief from her symptoms of intermittent claudication. The case report illustrates the importance of taking care of the body as a whole and not just one system.

The effects of strain from faulty weight distribution on the production of intermittent claudication; Case Report: Mr. B, white male, aged 72, patient of Dr. Grant Laing, first noted pains in his feet on walking two years ago, but he now has pains in the calves and thighs of his legs on walking one half block. The pains are relieved on rest. Examination revealed a slow auricular fibrillation, mild diabetes mellitus, gout, calcium deposits in the distal portion of the abdominal aorta, and moderate impairment of the arterial circulation in both legs. It was felt that the symptoms were out of proportion to the impairment of the arterial circulation and orthopedic consultation was had. A short Achilles tendon was found in both legs and a one-half inch lift was put in both heels of his shoes with striking and immediate relief of symptoms. The diabetes, gout and nutritional deficiencies were also brought under control with further relief. This case report illustrates that intermittent claudication can be markedly aggravated by faulty shoes and correctible metabolic disturbances.

Nutritional factors concerned with intermittent claudication; Case Report: Mr. S, white male, aged 65, when first seen in Janury, 1951, with complaints of severe rest pains and intermittent claudication in his right leg. Gangrene of the toes of his right foot set in and amputation of the right leg above the knee was done. Examination of the tissues showed an atherosclerosis obliterans at the bifurcation of the popliteal artery. He was seen again in September, 1954, with complaints of severe rest pains and intermittent claudication in his left leg, a scaly rash over his arms and left leg, and amputated right leg. Recordings of the arterial circulation in the left leg revealed marked impairment originating above the knee. The scaly rash was diagnosed as being on a nutritional basis. Treatment consisted of daily injections of liver extract and vitamins and massage to the left leg. The scaly rash disappeared, the rest pains cleared up within one month, the walking tolerance without pain increased to over one mile in a year, and the recorded arterial circulation at the left ankle increased from 12 ml per minute to 20 ml per minute in one year. This case report illustrates a patient with severe occlusive arterial disease leading to amputation of the right leg, and the importance of nutritional disturbances in aggravating intermittent claudication of the left leg.

Blood sugar and the arterial circulation in the legs; Case Report: Mr. L, white male, aged 56 with symptoms of rest pains, intermittent claudication, and diabetes mellitus had been treated by control of the diabetes as well as local treatment of his legs with massage with marked re-

lief of symptoms. As part of the study, a sugar tolerance test was made while the arterial circulation was measured at the ankles at one-half hour intervals. The blood sugar rose from the control of 140 to 320 and the arterial circulation showed no appreciable change. This study indicates that the blood sugar level per se does not affect the arterial circulation.

Massage to the legs for intermittent claudication: All of the patients with intermittent claudication with or without rest pains were instructed in the home treatment of massage to the legs. An Oster M-1 massager was used for one-half hour daily to the affected extremity with the following results: (1) a single one-half hour massage to the leg produces no demonstrable effect on the recordable arterial circulation; (2) the recordable arterial circulation is doubled in one year; (3) the rest pains disappeared in about one month; and (4) the walking tolerance without pain increased from one-half block to about one mile in one year.

Discussion

There is an opinion that spontaneous recovery from intermittent claudication is a frequent occurrence. If there are existing correctible conditions such as gross metabolic disturbances, nutritional impairment, aggravation of the arterial circulation by antihypertensive drugs in the presence of mild or moderate occlusive arterial disease, faulty shoes, etc., one can understand that correcting these may give secondary relief from the intermittent claudication. On the other hand, in my experience, I have not seen spontaneous improvement of the recorded arterial circulation distal to the occlusion.

A number of patients with mild occlusive arterial disease to the legs insufficient to produce symptoms of intermittent claudication, have hypertension of the arms. If these patients are treated with antihypertensive drugs they may develop severe hypotension with further impairment of the arterial circulation to the legs with severe symptoms of intermittent claudication such as the patient cited. On cessation of the medication the blood pressure in the legs slowly improves, but the arterial circulation does not improve in like proportion indicating that possibly part of the action of the antihypertensive drugs is toxic. It is interesting to note that about 10% of the patients in this series of 41 patients with intermittent claudication fall into this category. It would seem important to determine the blood pressure and state of the arterial circulation in the legs before giving antihypertensive drugs.

The effects of the pain of intermittent claudication in obliterating the arterial circulation as measured at the ankle is important, because it demonstrates graphically the ischemic nature of the pain. The marked reactive hyperemia following rest provides striking evidence of a vascular bed which is able to dilate under a suitable stimulus. Anatomically it is known that a preformed vascular bed exists which is usually nonfunctional. The beneficial effects of massage as presented in the text are thought to be due to making this vascular bed functional.

The question of the effects of lumbar sympathectomy on the arterial circulation and the symptoms of intermittent claudication from organic occlusive arterial disease was asked. My personal experience with this is limited to studies of its effects on one patient who had severe intermittent claudication of the right leg and marked occlusive arterial disease to both legs but more so in the right. A right lumbar sympathectomy was done by Dr. John Reynolds with no relief of symptoms and no improvement of the arterial circulation. However, he did obtain some measure of relief from massage.

Summary

This presentation illustrates by means of case reports some of the factors influencing intermittent claudication, and emphasizes the need for studying and treating the whole patient instead of limiting the diagnostic procedures and treatment only to the peripheral vascular system of the legs.

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The Railroad Doctor and PERSONAL INJURY LITIGATION

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Executive Vice Chairman
Association of American Railroads
Chicago, Illinois

In order to facilitate equitable disposition of claims, the claimant must be provided with the highest standard of treatment and an understanding of the pressures being applied to him.

This presentation will discuss the growing severity of the problems involved in the treatment of claims and law suits growing out of personal injuries in the railroad field.

When I treated this same subject in 1957 before this group, I pointed out the following significant facts:

A. The total cost of injuries to all persons on our railroads has doubled in the past 15 years despite the 50% reduction in accidents and a further reduction in severity.

B. These costs rose twice as fast as increased wages, medical expenses, and material costs.

C. Injuries to employees accounted for approximately 80% of such costs.

D. That ambulance chasing has a direct adverse effect upon the recovery and/or the rehabilitation of injured persons due to the competition between the few lawyers engaging in this practice which results in overemphasis of disability often coupled with advice to delay or restrict rehabilitation efforts until case is on trial.

E. That the increasing difficulty being experienced in successfully defending litigation increases the importance of intelligent medical management, treatment, and testimony.

I also called your attention to the activities of our Claims Research Bureau in which we endeavor to keep track of the results in all railroad employee cases and our postsettlement investigations to determine the eventual outcome of some of the more severe injury cases. In our field investigations, we determine many things which are of assistance to railroad claim, law, and medical departments. Some of this relates to errors of omission and commission by our own people and which, on occasion, involves the doctor. We learned among other things that considerable pressures are applied to these injured employees to employ counsel, and that one of the favorite arguments used is that the average railroad doctor is disinterested in the employee and is more likely to be favorable to the company when making reports or when testifying in court. While this is not a fact, it nevertheless points up the need for cultivating the type of medical management which will refute such suggestions.

Defendants generally are becoming more concerned with the types of cases now being brought in our courts with increasing frequency. I will relate some recent experiences. A jury in Cleveland, Ohio, rendered a verdict in the amount of $625,000 against a railroad in behalf of a railroad employee who allegedly was required to work near a pool of stagnant water. It was claimed that this pool was contaminated with poisonous insects and vermin. The employee alleged that he was bitten by an insect of this character which was responsible for the infection which resulted in the amputation of both of his legs and one of his arms. This verdict, is of course, currently being appealed by the rail-

road. You will be interested in the comments printed in *The Bulletin of The Academy of Medicine* in August, 1959 and I quote that article in full:

"Stagnant Water"

"A recent verdict in the amount of $625,000 against a railroad for forcing a man to work near a pool of stagnant water associated with 'poisonous insects and vermin' again raises the question whether courts are receiving competent medical advice.

"Such verdicts are anachronistic. They smack of miasma and witchcraft and reflect sadly on juror and jurist. Negligence is the key to such a verdict but what specific agent deriving from company neglect resulted in the plaintiff's loss of legs and earning power? Poisonous insects? The Anopheles group is the only water-incubated biting insect in these parts — and any rain puddle will breed Anopheles. But did this employee's loss result from a mosquito bite -- and, if so, was it shown beyond reasonable doubt that the mosquito came from the area of company neglect?

"If not insect then vermin, says the argument. What vermin? The only swamp-frequenting vermin in this latitude reasonably capable of biting humans are rodents and of these the most likely are rats. Was such a rodent bite sustained at or near the disputed area? Relationship of a bite to an underlying occlusive vascular disease would be most difficult to establish. Each day of our life contributes to the advance of chronic degenerative disorders — no bite is required.

"So behind the argument applied and sustained in this case lies the premise that any of the diseases which disable and inevitably kill man may be accelerated by external factors -- a possibility no one would deny. But that employers are to be held negligent if all such external factors are not anticipated and precluded is fantastic.

"That jurors and jurists are capable of precedent-making decisions based upon mysticism and fantasy is a terrifying prospect in this 'enlightened' age."

The next case involved a $38,000 verdict which was returned by a jury in Columbus, Ohio, involving a double leg amputation of a trespasser who was found in the railroad yards in that condition. Investigation failed to disclose how he got into the yards and further established the fact that the plaintiff was intoxicated, having visited one or more bars during the previous day. The plaintiff could not recall what happened to him or what brought him into the railroad yards. However, after the administration of sodium amytol, his recollection was sufficiently refreshed so that he could recall the circumstances which led to a verdict. It was with satisfaction that we later learned that the trial court had reversed the judgment of the jury and found for the railroad company.

The next case involved an engineer of a railroad who sued the railroad company, alleging that it was negligence on the part of the railroad company to order him to proceed with a weed spraying operation without providing him some safeguard from any harmful effects which would result from exposure to the spray and fumes emanating therefrom. The plaintiff's lawyer urged the court to consider such an act a negligent one when the employer knew that the engineer had had a series of bronchial and pulmonary episodes for several years prior to that time. The court rejected the plaintiff's theory and the verdict was in favor of the railroad company.

Another case involved the Metropolitan Authority of Massachusetts. One of their trains stopped in a tunnel due to power failure. The plaintiff, a passenger, had a serious heart condition, and while the train was stopped in the tunnel, he suffered a heart attack and died. There was evidence that the car was crowded and filled with tobacco smoke. There was also some evidence that this passenger might have been removed from the tunnel a little quicker if the Transit employees had utilized other methods. Again the court rejected the plaintiff's contentions and the verdict was in favor of the Transit Authority.

There are still other cases which I will not bother to comment on, but which fall into the same general category, and you may be certain that we will continue to see lawyers file claims and suits based upon comparable situations so that we have a real problem in the making.

This situation should bring home to us the growing need for industry to establish and maintain standards of health in the employment and in the continuation of employment to avoid exposing men to risks in certain job classifications which might prove detrimental to their future health or physical condition, or which might be responsible for injuries to others. We must be careful not to establish capricious standards but, at the same time, we should not treat the problem in a superficial manner.

Many of you are familiar with the type of medical testimony which is all too prevelant in some of our larger cities and occasionally crops up in other locations as well. Frequently we find the testimony of the plaintiffs' and defendants' doctors so diametrically opposed to each other that reconciliation of these points of view are impossible. More often they occur in situations

where this tremendous difference should not exist. You will, therefore, be interested in what is happening in different sections of the country to meet that situation.

A few years ago, the judges of the Supreme Court of New York, with the cooperation of the local bar associations and medical societies, set up the Impartial Medical Testimony project which was carried on for an experimental two-year period, at the end of which time it had proved so successful, it was adopted on a permanent basis. The results of this project are incorporated in a report now published in book form by the MacMillan Company entitled, *Impartial Medical Testimony*. This book makes interesting reading and describes the methods incorporated in establishing such panels. Briefly, the medical society names qualified men to panels in the various specialties of the profession. The list is maintained by the state medical society and the court calls upon the secretary of the medical society for the next name in rotation of such doctor from the particular panel involved. The doctor has the right to request all of the hospital records and medical reports from all treating and examining physicians so that he may have the benefit of all of the facts when making his findings. It was found in New York that this procedure had a prophylactic effect upon the doctors who previously specialized in testimony and had a general wholesome effect upon the presentation of medical testimony in court. It is also said to have pointed the way to better diagnosis in the field of traumatic causation.

The main function of the panel physician is to detect errors or false statements occurring in the positions taken by either the plaintiffs' or defendants' physician and to furnish their own affirmative findings. The report reflects that the most striking need for their services becomes apparent in terms of x-ray interpretation. In the unexpectedly large total of 24 cases out of 100 reviewed by one consultant, errors in x-ray technique or interpretation on the part of the previous physicians were detected by the panel expert. In one instance, the expert found a fracture which had not previously been diagnosed. In the 23 other cases, claims of "fracture" were made which the expert found to be in error. Another point they found of considerable interest was the fact that there were 27 of the 100 cases studied in which there was a diagnosis of concussion and/or a fracture of the skull, but in which no examination of the spinal fluid had been made.

I urge you to support Impartial Medical Panels whenever you have the opportunity to do so, and I likewise urge you to insist that such panels always be selected by the state medical society which should conduct this operation to avoid any opportunity for the impartial aspects of this project to be disturbed. I urge you further to give careful consideration to the problems we have been discussing with the view of analyzing your present methods of treatment and management to determine if they are the best that can be employed in meeting this problem.

I would like to call your particular attention to the great need for care in getting detailed histories in these cases and further to make careful notes of all physical conditions existing at the time of the first examination. Your subsequent treatment of the patient must, of course, follow the high standards which you employ in your particular field, but, in addition, they should likewise encompass certain definite procedures to rule out the possibility of exaggerated or false claims which often result when your patient employs counsel who may be more interested in building up a case of damages than he is in the equities of the situation.

I consider the treating doctor the most important factor in the amicable and equitable settlement of personal injury claims. This is particularly true in our railroad cases, and our postsettlement investigations have corroborated our feelings on this subject.

I am sure you understand that your claim department is definitely interested in the friendly and equitable disposition of its claims. I am sure you also understand that what I am urging here is that, in order for this to be accomplished, you must provide the claimant with the highest standard of treatment, coupled with an understanding of the pressures which are being applied to him, which, in many instances, interfere with his recovery and eventual rehabilitation.

I want to repeat that where a patient has a compensable injury, he requires different medical management than where his injury is noncompensable. Where you have knowledge of the exaggerations and misrepresentations which appear in such cases when they fall into the hands of a few unscrupulous lawyers or doctors, you will wish to extend your investigation of your patient's physical condition to the point where you can rule out the likelihood that such misrepresentations can be demonstrated as having the foundation of truth. Nothing should ever be taken away from the injured person, and any reasonable doubt which may exist should be determined in his favor, but, by the same token, we should not make it easy for him or her to capitalize on an occurrence to the degree which we find in too many cases.

Surgical Treatment of
BREAST CANCER
Central and Inner Quadrant Lesions

• OLIVER V. RENAUD, M.D.
Chicago, Rock Island and Pacific Railroad
Chicago, Illinois

Salvage of patients with cancer in the central and inner quadrants of the breast is increased by performing radical mastectomy encompassing the lymph nodes in the internal mammary chain on the ipsilateral side by an en bloc in continuity resection of the internal mammary lymph node chain.

Since Halsted described the classical radical mastectomy, which included the removal of the pectoralis major and minor muscles and axillary dissection, the over-all salvage of primary operable cancers of the breast has remained about the same. The number of far advanced, inoperable breast cancers has decreased because of education of the public regarding self-examination of the breast, etc., by private groups, the medical societies, and the American Cancer Society educational programs.

It has long been recognized that cancers arising in the central or inner quadrants of the breast have a poorer prognosis than those arising in the outer quadrants of the breast. In an attempt to increase the salvage of those patients with central or inner quadrant cancers, Urban and Baker in 1951 enlarged upon the Halsted radical mastectomy to encompass the lymph nodes in the internal mammary chain on the ipsilateral side by an en bloc in continuity resection of the internal mammary lymph node chain.

Reduced to its simplest form, the technique is to outline the skin flaps in the usual manner for a straight radical mastectomy. The pleural cavity is entered through the first anterior interspace and the internal mammary vessels are identified, ligated and divided, the point of division being at the upper margin of the first interspace. The fifth interspace is then entered, with ligation and division of the internal mammary vessels, and, using a sternal splitting knife, the ipsilateral half of the sternum between the first and sixth ribs, with the attached internal mammary chain of vessels and lymph nodes and the costochondral cartilage, is resected in one piece, representing a full thickness of that portion of the anterior chest wall with the internal mammary chain attached.

The defect left by the full thickness resection of the chest wall is closed by suturing a piece of fascia lata which had been removed from the patient's thigh prior to starting the operation in the breast area. The remainder of the radical mastectomy, with the full thickness of the chest wall left attached to the specimen by the pectoralis major muscle fibers, is no different than the straight radical mastectomy until the time of closure of the skin flaps over the operational area and reconstruction of the chest wall defect.

The full thickness of skin with undermining of the contralateral breast for mobilization of the medial skin flap must be carried out so as to place the suture line lateral to the fascia lata graft site, with fixation of the mobilized tissues to the anterior chest wall, thereby reducing the tension on the suture line. Because of fixation of the mobilized full thickness of skin and breast by multiple deep fixation sutures, and with the suture line not overlying the fascia lata graft site, should a slough of the skin flaps at the suture line occur, the flaps will not recede to expose the fascia lata graft.

The usual thoracotomy tube connected to the subaqueous deflation bottle was attached prior to closure of the defect in the chest wall.

The operating time is not increased by more than one-half hour over that for the classical radical mastectomy if a second surgical team obtains the fascia lata graft while the skin flaps are being turned back and the chest wall resected. The patient is usually ready for discharge from the hospital by the seventh or eighth postoperative day.

The largest series of cases is that reported by Urban of Memorial Center in New York City, and the operative mortality of 285 consecutive cases in patients between the ages of 30 to 70 years was less than 1%, there having been two deaths, one from a cerebrovascular accident and the other from a perforated peptic ulcer.

There is no functional deformity resulting from the chest wall resection.

Pathological Findings

Of the first 270 cases done at Memorial Center in New York City, 35.5% had positive nodes in the internal mammary chain, and 48.2% had positive axillary nodes. Of those with negative axillary nodes, 15% had positive internal mammary nodes. In about 8% of this group, the internal mammary nodes were the only nodes involved with metastases.

Analysis Node Metastases—270 Cases

All nodes negative	119	44.0%
Internal mammary nodes only involved	21	7.8%
Axillary nodes only involved	55	20.4%
Both internal mammary and axillary nodes involved	75	27.8%
	270	100.0%

Since the operation was first performed in 1951, only 55 cases had been done five or more years ago, as reported by Urban. These 55 cases which underwent the combined en bloc resection were compared with the over-all five-year salvage in 1,000 primary operable breast cancers treated by radical mastectomy and postoperative x-ray therapy at Memorial Center between the years 1944 and 1947. This group yielded an over-all five-year salvage of 49%. Of the 55 cases, 33 were clinically free of disease, representing a 60% five-year salvage. It is of interest to review the regional node metastasis of these 55 cases (Table I).

TABLE I.

	Total Number	N.E.D.	Alive with Disease	5 Year Salvage
All nodes clear	21	17	0	17
Only axillary nodes +	12	8	1	9
Only internal mammary nodes +	3	1	0	1
Both axillary and internal mammary nodes +	19	7	2	9
Total	55	33	3	36
Internal mammary nodes +		22/55 = 40.0%		
Axillary nodes +		31/55 = 56.4%		
5 years living, clinically free of disease (N.E.D.)		33/55 = 60.0%		

Summary and Conclusions

Radical mastectomy with en bloc in continuity resection of ipsilateral internal mammary lymph node chain can be carried out with an operative mortality no greater than that for a straight radical mastectomy, by surgeons trained in the procedure.

The over-all five-year salvage, clinically free of disease, of the 55 cases reported by Urban was 60%, as compared to a 49% five-year salvage of 1,000 cases treated by the classical Halsted radical mastectomy with postoperative x-ray therapy at Memorial Center in New York City between the years of 1944 and 1947.

All This and Cancer Too?

The feeling of well-being experienced by smokers may well result from the release of tiny amounts of a potent hormone, it was suggested by a British scientist at a conference devoted to the heart and circulatory effects of nicotine and tobacco smoking.

Dr. J. Harold Burn of Oxford University suggested that the release of norepinephrine (closely related to Adrenalin or epinephrine) in the brain is partly responsible for the "increased feeling of cheerfulness and a sense of relief from fatigue" experienced by the smoker.

The British scientist said that norepinephrine is made by special cells in or near the skin, the heart, blood vessels and the brain. Nicotine, he said, causes the release of norepinephrine by these tissues. The enhanced supply of norepinephrine in the brain is the presumed basis for the antidepression action of the new "psychic energizer" compounds, and the reverse the reason for the tranquilizing action of reserpine.

The release of norepinephrine in the skin accounts for reduced blood flow in that tissue after smoking. Such release of the hormone makes the hair on a cat's tail stand on end when the animal is alarmed.

In an earlier report, Dr. Burn said that the more rapid beating of the heart after inhalation of cigarette smoke depended on release of norepinephrine in that organ after stimulation by nicotine. The smoker absorbs 35 mg to 60 mg of nicotine per pack of cigarettes inhaled, depending upon his smoking habits.

In the writings of a great English poet there is the line: "And human love needs human meriting." It is not known that Dan Lynch ever read that line, but memories of the kind of man he was and the kind of things he did bring it to mind and set it aglow with meanings.

Dan Lynch's career with the New England Telephone and Telegraph Company began in 1901. At age 18, and before there were women operators in telephone employment, he started as night operator for the Company in Boston. During the day he attended Boston College, completing his courses there in 1903. That autumn he enrolled at Tufts Medical School, and throughout the next four years he studied medicine in the daytime and continued as telephone operator at night. He received his M.D. at Tufts in 1907, graduating *cum laude*. At that point he left the Telephone Company for a period of postgraduate training, internship at St. Elizabeth's Hospital, Boston, and private practice. After several years he returned to the Telephone Company on a part-

Industrial Medicine's Hall of Fame

Daniel L. Lynch, M. D.
1883-1956

time basis, and in 1918 he gave up his practice to become the Company's first Medical Director. When he left the Company in 1948 at the compulsory retirement age of 65, he had been its Medical Director for 30 years.

He had three brothers who chose to become "telephone men." Two were connected with the New England Telephone and Telegraph Company, and a third with the New York Telephone Company. Once he was asked why he didn't aspire to an executive position as had his brothers, and he replied that from his earliest period as night operator he had believed the Company someday would need a full-time physician to look after its people. "And," he continued after a little pause, "I wanted to be that physician." There was almost the impression that he had refrained from saying "intended." Asked then why he thought the Company would employ him as its physician he said he didn't know; he just believed. He realized, of course, that he would have to have a medical education, and so he set about getting it. Meanwhile the Company executives knew of his medical studies, and were kept informed of his progress.

An interesting sidelight on the experiences of the pioneers in industrial medicine might be found in an account of what the early Medical Directors had to start with in the way of quarters and equipment. Whatever small space could be spared seemed standard for the one, and a desk and chair for the other. Many, like Volney Cheney, at Armour, began with no more. Some, as Hart Fisher, at Chicago Rapid Transit, fared slightly better; Hart had a table. And Willard Denno, at Standard Oil of New Jersey — in addition to an office that was "only a small cubbyhole, barely wide enough to hold a desk and a chair" — had a first aid room even smaller, "dark, dingy, and containing practically no equipment." A few, like Tom Crowder, at Pullman, came into certain extras. Tom said of his plus: "When I started with the Pullman Company they gave me a little office and a great hell of a stack of papers." And Andrew Harvey, at Crane Co., had a washstand and a bathtub. Those starts were above the norm — as far above as Dan Lynch's was below. He began with neither place nor plus. He had a desk and a chair, but they were his own. Not until later was he given a place to put

them. He was assigned a small corner, partitioned by a portable screen from the office of which it was a part. After a while he succeeded in obtaining a nurse, and, in further time, a clerk who served as secretary.

But it wasn't only a small office or a sequestered corner that the newly-appointed Medical Director stepped into. It was an opportunity. And it wasn't the meager equipment he and his fellows found that was important, but the equipment they brought within themselves — the temperament, abilities, and qualities of heart and mind that made them, then, seem only different, but now in the long perspective prove them to have been great. They were pioneers in the true sense. The uncharted territory into which they ventured was an undefined, inchoate need, and they had to build with only the need to guide the architecture. How well and truly they built is written for all to read. In this day of the certified industrial medical specialist and the many employee medical services that owe so much to the genius of those pioneers, it is fitting that the desk and chair and portable partition be remembered, if only as symbols of the fact that industrial medicine had its own beginning, humble, even primitive — but independent.

What Dan Lynch brought within himself to the small corner in which his full-time industrial medical service started was quickly apparent. For some years he had been getting ready for his appointment as Medical Director as if he knew it to be imminent. While still in private practice he had signed up as a charter member of the newly-formed association of industrial physicians, and of Magnus Alexander's Conference Board of Physicians in Industry. Through the contacts these groups afforded he learned what Medical Directors were doing, particularly those in the New England area who comprised the majority of the Conference Board's small membership. And so when his appointment came he was prepared. And as the Telephone Company grew, and his Medical Department grew with it and extended its usefulness in manner and form of service, he knew what to add, and where and when to add it. All with the result that upon his retirement in 1948 he turned over to his able successor, Doctor George F. Wilkins, who had been his Assistant Medical Director for some 12 years and had helped him build it, a "very model" among industrial clinics, widely known and freely emulated. His ambition had been to make it the best of its kind, and many who visited it agreed that it was. But Dan himself admitted to certain of his friends that he knew of another he thought was a little better. However, he didn't name it.

Hardly had he become settled as Medical Director before it was noised about that here was a man who was more than a good doctor; here was a responsive, sympathetic, human person with a big heart and a gentle smile. And soon there was added to this: here was a friend. For so it proved. He not only cared about each patient as an individual, but he also took pains to show that he cared. The "also" got him into some real battles with management when he felt that an employee was not being treated fairly. Often in these goings-to-the-front he was quite as much Dan Lynch as Doctor Lynch. On the other hand, he became equally indignant when he had reason to believe an employee was taking advantage. Repeated episodes of this kind made him known far and wide throughout the Company as an honest and conscientious man who stood by his convictions, and accordingly when he put up an argument for what he believed was right he was rarely unsuccessful. Where his people were concerned he was the embattled champion of fairness.

During the Congressional Subcommittee hearings on the first of the bills that led to the passage of the Railroad Retirement Act in the early thirties, one of the lawyers who had helped to prepare the bill remarked that he wished, for all employed people, that they could look forward to pensions on retirement. His associates thought him a dreamer. But, through Social Security and the establishment of corporate pension plans under Treasury regulations, he was to see his wish almost come true. Similarly, Dan Lynch must have wished that the benefits and advantages of industrial medical services could be extended to everyone in employment. This is a reasonable conclusion, since, from the very beginning of his career, he did all he could toward the reaching out of industrial medicine to more employees in more places, and to his last years maintained a continuing interest in the agencies that seemed likely to hasten its wider application. If he was a dreamer, he was a practical one. When he joined an organization it was his purpose to be active, and useful, in its affairs. In the association then known as the American Association of Industrial Physicians & Surgeons he began with committee work, where his wisdom, good judgment, sincerity, and willingness soon marked him as a leader and brought him greater responsibilities. In addition to these he assumed others; "he actually worked night and day on behalf of the AAIP&S, and for years he was a prime recruiter for membership in the New England District." After long serving the association in various administrative capacities he became its nineteenth president in 1940, the year in which the membership reached its first

thousand, following a steady climb from a fourth of that number only six years before. Later he was president of the New England industrial physicians' association.

During his retirement years he was Consultant in Industrial Medicine for the Veterans' Administration, and member of the Advisory Committee, Boston College School of Nursing. In 1946 he had been made Chairman of the Massachusetts Medical Society's Council on Industrial Health; in 1949, at his own request, he was relieved of the Council's chairmanship to become the first Chairman of the Medical Society's newly-established Section on Industrial Medicine. He lived to see the AAIP&S, to which he had given so much time and service, increase the number of its members to more than three thousand. He died in February, 1956, at his home in Roslindale, Massachusetts.

As a physician, Dan Lynch attained early eminence among his people, and their recognition of his talents found continued expression in the respect and confidence with which they turned to him as "doctor." Equally evident was their appreication of him as humanitarian. There, too, his talents were bright with use. Physician, humanitarian, he loved his fellow men.

It is reported of late that medicine has discovered "the amazing new science of love." That, of course, is the "loving kindness" of scriptural meaning. It is said, too, that physicians are learning to prescribe it. The really amazing part of this is that anyone should believe such love a science, or consider it new. Poets and philosophers know better. The poet's vision long has been that of love's full circle, part shaded by the human hurt, part shining with the means of its alleviation — the shadows of strivings, inhibitions, frustrations, complexes, anxieties, secret ills that fester, moving in and out among the lights of insight, kindness, sympathy, tolerance, understanding, all in the kaleidoscope of the passing days, the pattern shifting, the circle staying whole. What formula of science can catch that interplay? This is a vision more clearly sensed than seen. It eludes the grasp; vanishes from analysis. Yet it touches the lives of many, and "the poet in every man" responds with vague perception oftener than he knows. The act of kindness and the act of cruelty move him — the one, bright "human love" out-going; the other, the shadow of its turning in. And both, and the reactions they arouse within him, still inside the circle. It is believable that if ever Dan Lynch had described or pictured his concept of "human love" it would have been something like that. He used the lights of the circle to interpret the shadows, and thus, with love his guide, he arrived at understanding. If the scientists are to systematize love, they could do much worse than to start with "Lynch's Law."

Dan Lynch, however, had no time to describe his kind of "human love"; he was too busy living it. He was a righteous man — in the tradition of the native New Englander, sternly so. But his sternness was almost lost in a sensitive consideration for the other fellow so purely personal as to lift it clear away from any sense of duty, too subjective to let him think of it as separable enough to be blanketed in a generality. There is no record that he ever used that outworn phrase "the dignity of man"; if he had he would have named the man. It is possible that a certain objectivity could have been inspired by the fact that his fourth-floor office in the Telephone Building looked down on the wharf site of the Boston Tea Party. There might have come to his mind sometimes an unworded contrast of the virile independence the memory of that event recalled, with the creeping clamp of regimentation and togetherness that seemed about to squeeze all individuality into a sterile reliance on things other than itself. He was uncomfortably aware of this trend; even in his time it was coming "up like thunder." But he knew no way to stop it. All he could do about it was to be himself, the captain of his own personality, and to help others to be the same. That was wholly a person-to-person matter, and it had to be lived in a person-to-person way. The exemplary way he lived its give-and-take in daily contacts was so genuine, so warm and real, that it seemed to create an atmosphere about him, and those who came within it found it almost palpable.

His Medical Department and the people it served in particular, and the development of industrial medicine in general, were his vocation and his avocation. If he had any hobby, they were that, too. Between them his days were full to the brim, his life alert with interest. Yet, during his active years, what hours the two permitted were largely spent in visiting disabled and ill employees in home or hospital, and in helping — often with sums of money from his own funds — employees who, because of illness or other family misfortune, were finding the going rough. Shy and modest almost to a fault, he would never speak of these things, or others of the like that he was doing, and he was embarrassed, sometimes to the point of resentment, when anyone mentioned them. But they were typical of the poetry of deeds in which he expressed what human love and its human meriting meant to him.

His interest in industrial medicine moved him occasionally to give talks, and write articles, on certain of its problems. Many of these were

published. All of them dealt adequately with their subjects, but none was particularly revelatory of their author. They show him to have been an independent thinker and a careful analyst, and to have had well-based and firm opinions. But for the reader who didn't know him they were introductions — formal, nothing more. Only rarely did he let them open the window a little upon the inner self which, for the discerning, made acquaintance a pleasure and friendship a privilege. One glimpse is found in an article on "Absence Due to Sickness," published in 1943:[1] "If you ride the crowded street cars or trains frequently as I do, and observe the rows of men and women in their working clothes, grimy with the dirt of shipyard or factory work and perspiration, and nodding sleepily, you must believe with me that these persons are tired . . . Let there be less criticism of the men and women who are doing their best with patriotism and loyalty to keep production humming." Another occurs in "Industrial Health and the War," appearing the same year:[2] "Industry must abandon the philosophy of 'take care of the technical situation and let humanity handle itself.' It must realize 'that sentiment is perhaps more important than logic in dealing with workers; that the men at the bench have feelings other than those expressed in terms of hours and wages; that they need social recognition in the shop quite as much as they need it in the neighborhood where they live.'" And a third in "Who Can Work?" also published in 1943:[3] "I caused wonder in the early days of pre-employment examinations when I accepted a one-legged man as a stationary fireman. He has worked for about 20 years, and he has not been injured at work in any way at any time. Some time ago we accepted, for drafting, a young woman born with a thumb but no fingers on her left hand, only a thumb and rudimentary index finger on her right hand. She can thread a fine needle. In recent years I have been privileged to supply 97 persons with an artificial larynx when surgery for cancer of the throat made it necessary to remove the voice box containing the vocal cords. About 10 years ago the Bell Telephone Laboratories developed the artificial larynx, and with it these persons can talk. They do talk, some of them extremely well. All of them can work; most of them did work again; some are still working." Meager glimpses these — the third one especially, in that the author omits to mention his own important role in the development of the artificial larynx he talks about. But they more than hint of the human love looking out from its shadows, mute in its need for human meriting, and this man, with sympathy and understanding, meriting it as best he could.

Recognitions were inevitable, and many came. He valued most the ones from his own people; they were tributes. Several times the employees overbore his self-effacement and made him realize the measure of their esteem. The Alexander Graham Bell Post, No. 299, American Legion, cited him, in apt and mirroring phrases, for "his outstanding efforts and devotion, and above all else, his humane and generous treatment of his fellow men, and his great personal understanding of their human problems." When he retired, the International Brotherhood of Telephone Workers gave him an automobile, and, suspending its rules for the occasion, voted him in as a member. And the Telephone Pioneers of America gave him a life membership. Among other awards was a citation by the American Red Cross for having organized and established the first class in First Aid for Lay People, in 1926. The Military Order of the Purple Heart cited him for "exceptionally meritorious and conspicuous service"; and the New England Industrial Nurses Association formally acknowledged his "enthusiasm and whole-hearted cooperation in all matters pertaining to industrial nursing." In April, 1948, shortly before his retirement, and seven years after his term as its president had ended, the AAIP&S gave him its Award for Distinguished and Meritorious Service, in recognition of his continued efforts in its behalf.

Not until after he was taken was it generally known that he was long a prominent Catholic layman; was, at the time of his death, president of the Nazareth Guild of Telephone Workers, a charitable organization associated with the Nazareth Home for Children; had served as an official of the Catholic Alumni Sodality in Boston and St. Luke's Guild, and was a member of the Sacred Heart Holy Name Society of Roslindale.[4]

Among well-known bequests in fiction is that of Mr. Valiant-for-Truth: "My sword I give to him that shall succeed me in my pilgrimage; my courage and skill to him that can get it." Also of imaginative fashioning might be the testament of Abou Ben Adhem: "My mantle I leave to him who can wear it." In factual happening, many have tried it on. Some it almost fitted. A few there were who wore it rather well, and several who wore it better. But on Dan Lynch it had the grace of best.

Thus Daniel Lawrence Lynch — large-brained, clear-eyed, great-hearted respecter of the image of God in which all men are made. As time goes on since he laid aside his work and left its scenes, his place in industrial medicine's Hall of Fame grows brighter year by year. For it shines against the increasing darkness of the trend he saw was coming and knew no way to stop.

It wasn't allowed him to realize that his own career would be an example of the one thing that could give it pause; that the kind of medicine he practiced was the kind all men respond to; that human meriting of human love — not to be found in politics, or science, or school, or even in church save possibly sometimes in an hour on Sunday — is medicine for every man's self respect, which alone will save him from the quicksands of total conformity. People are love's world, and they were his world, and in it no man was a number, a statistic, a unit in a mass, an inhabitant of a hospital bed. Each was a human being, an individual person, and Dan Lynch met him and cared for him and about him on the man-to-man plateau of mutual respect. It is fortunate for industrial medicine that it owns Dan Lynch among the giants of its past. It will be unfortunate for industrial medicine, and for all who are concerned in its future, if its practice is continued in the impersonal manner of the highly scientific rather than the humane manner of the simply human. Those responsible will someday be reminded: " 'Tis ye, 'tis your estranged faces, that miss the many-splendored thing."

—A.D.C.

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Retirement Choice

When employees are free to help choose their own time of retirement, everyone benefits, according to Dwight S. Sargent, personnel director of Consolidated Edison Company of New York, on the first two years' results of experiment in free choice of retirement age.

"Our experience illustrates quite vividly that the individual is the only one who can make the decision as to what is best for him. Employees' skills that otherwise would be thrown away are utilized for a further period, which means that these people continue to be producers, better consumers and taxpayers for a longer period. Also, the total cost of pensions to the employer and to Social Security is somewhat reduced."

Prior to January 1, 1958, when Consolidated Edison's experiment began, men were required to retire at 65 and women at 60. Now men considered fit to continue on the job are permitted to retire voluntarily after reaching 65, but may continue working until 68. For women the voluntary retirement age is 60 and the mandatory age 65.

Mr. Sargent reported that two-thirds of employees reaching voluntary retirement age to date have been considered fit and given the option to continue working. Of these, 35% of the men and 59% of the women elected to stay on the job.

Of the first 120 men who elected to continue working, 79 are still on the job with an average extended working time of one and one-half years.

Performance records for the group of 120 are 8% excellent, 23% very good, 64% good, 5% fair, and 1% unsatisfactory.

Of the 79 men still working, 60% have had no absences and the absence severity rate of the group is 2.5 days per year compared to the company's average of 7.2 days per year for all men.

Mr. Sargent said that it is impossible to project how long women will remain on the job, since the first to continue working voluntarily are just now reaching age 62, when they become eligible for Social Security.

To date, Consolidated Edison's plan has resulted in about 5% reduction in pension costs.

In stressing the advantages of the plan in extending individual's ability to be producers, better consumers and taxpayers, Mr. Sargent pointed out that a "very high" percentage of those continuing to work would have been unable to find other work had they been required to retire at retirement age.

Abstracts

Traumatic Hemobilia with Severe Hematemesis and Melena

by B. R. SWORN, Stafford *British Journal of Surgery*, November, 1959

The presence of blood in the bile ducts is a little discussed entity. It may be due to trauma or disease of the liver, gall bladder or bile ducts, injury to the hepatic vessels or portal vein, or as a reflux from the duodenum. Traumatic hemobilia was first discussed in the literature in 1948; the characteristic features being described as subcapsular liver tear from external abdominal injury of the closed type, followed by a latent period of variable duration and typified by attacks of pain suggestive of biliary colic and the presence of blood in the stool.

Further reports indicated that in conjunction with the above obstructive jaundice appeared in about 50% of these patients. The author discussed 20 cases of traumatic hemobilia and added one of his own. In the majority of cases there was a major laceration of the liver; some of them being previously surgically repaired before the advent of hemobilia. A mortality rate of 50% accompanies those cases of massive hemorrhage. Simple drainage of the intrahepatic hematoma does not seem to be effective, nor is drainage of the common bile duct or gall bladder. Either packing of the cavity to allow eventual obliteration or partial hepatectomy is advocated. Another possibility in the treatment is ligature of the hepatic artery. Hepatic arteriography would be a helpful adjunct in deciding the treatment of choice. —JOHN M. JOHNSTON, M.D.

Thrombosis as the Cause of Death in Dogs that Survived Acute Circulatory Failure

by R. ARROYAVE, C. VIZACANIO, R. MacDONALD, and F. MURGA in *Surgery*, March, 1960

The immediate necessity of an open airway and early manual systole in the treatment of cardiac arrest are generally known. Time is an important factor in increasing survival rate and reducing the number of permanent sequelae in the nervous system. Inadequate ventilation during anesthesia accounts for cardiac arrest in most cases and prolonged anoxia of the nervous system has been blamed as the cause of death.

The maximum blood pressure produced by manual systole was 700 mm Hg. Furthermore, stasis occurs in the veins and small terminal arteries, thus either emboli or thrombi may be produced. Thrombosis in the blood vessels of vital organs, and consequent tissue necrosis in the brain, lungs and kidneys of dogs that survived five days or more after cardiac arrest was demonstrated in this experiment. It therefore appears that treatment of cases that survive cardiac arrest should be similar to that of cerebral thrombosis resulting from other causes. This suggests that anticoagulants should be tried as an adjunct in cases of cardiac arrest.

—W. A. WICHOWSKI, M.D.

Rx For Easing Executive Workloads

by C. A. CERAMI, in *Dun's Review*, Feb., 1960

Every company can reach new levels of personal and group effectiveness by adopting a simple work secret that is proving equally applicable to individuals and to committees. Psychologists and medical men who have specialized in protecting executive health say: "Men who can make their own schedules should plan to spend a day at home periodically if home can be made a quiet place to work.

"When possible the custom of allowing executives to work part of the day in strict privacy behind closed doors should be revived.

"Companies should consider taking a room in a hotel or club where executives can retreat for a few hours of concentration. The length of work day has virtually no effect on health whereas a tense, cluttered day, however short it may be, is definitely a menace to health.

"Every hour spent looking at a job from a little distance will pay back a hundred times over in terms of new energy, new solutions to problems and clearer perspective."

—ROBERT COLLIER PAGE, M.D.

Needed—Better Business "Ambassadors"

by HARLAN CLEVELAND in *Dun's Review*, February, 1960

Many American companies faced with the mounting price of their own paternalism are now making serious efforts to pull out of the social service business. Companies which are operating overseas realize that the long term interests of the host country will hardly be advanced by a system which eliminates individual initiative and fails to develop voluntary group action in solving community problems.

The new conditions of work abroad require a new kind of American business man. He must have certain qualities of mind and spirit, and still know his business. He must have "an adaptable technical skill." He must have "a strong belief in his own mission." He should have the quality of cultural empathy, a sense for politics and organizational ability, and "the special talent for working himself out of a job" (and what happens to him after that?).

—ROBERT COLLIER PAGE, M.D.

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May, 1960

VOLUME XXIX

NUMBER 5

Robert Thomas Legge

In 1951, when Dr. Legge was given the Knudsen Award, it was our privilege to summarize in three pages his remarkable career of more than 50 years in industrial medicine.[1] It was an unfinished account; its time distinctions were oftener "is" than "was." He was one of us; then at 79 too vital, too alive, to be thought of except as here and now. And so with the things he had done. They did not seem remote. His achievements were part of him, and the aura of his illustrious past shone round his place as the beloved Nestor of our field.

But even in writing of that story there was the haunting feeling here was a man who already belonged to history, a career whose influence already was impressed upon the years. Now that he has been taken, it may be permitted to inquire as to the why of that feeling.

Its principal cause seems to have been related to Dr. Legge's experience at McCloud, California, at the turn of the century. This was a "company" town, the seat of the extensive operations of the McCloud River Lumber Company, in a great pine forest at the southeastern base of Mount Shasta. Two mills, working night and day, cut a million feet every 48 hours. In 1899, at age 27, fresh from his internship, he became the company's Chief Surgeon. In this frontier center of a notoriously hazardous occupation, "he began with nothing but trauma." But when he left at the end of 1914, to join the University of California faculty, he "had established industrial medicine in the modern pattern; and had assisted in creating a thriving and healthy town, in inaugurating public health and safety measures and a community health and welfare program, and in building a hospital and outpatient service where curative and preventive medicine were successfully practiced . . . communicable diseases had been controlled, and morbidity and accidents, absenteeism and turnover minimized."

Except for some scattered objective descriptions of what he had done, after he had done it, the story of Dr. Legge's 15 years at McCloud had never been told. As the details of how he did it were drawn bit by bit from his notes and recollections, they merged into a microcosm of industrial medicine with its hopes translated and its aims attained. In setting, color, action, drama, as they characterize the history of the West, this was an unwritten chapter of the American epic. For the development of industrial medicine it provided an impressive succession of "firsts." Today, its events seem really remote, and by chronological reckoning they are. Decades ago, when so many of those who were destined to become leaders in industrial medicine

were just getting started, this unknown story of a new profession's burgeoning at McCloud, California, was being lived to its successful close. Not too far hence it will have become a classic.

Another reason for the feeling that the perspective of time was waiting in the wings had to do with the many more "firsts" with which Dr. Legge was identified. These seemed a steady product of his career as teacher, writer, scholar, historian, ambassador to world industrial medicine, and leader in organization activities. Among them were his courses in industrial hygiene, his students' health service and students' hospital, his record systems, his studies in the antiquities of occupations and their hazards. In the reaching out of the new profession, his "firsts" were too important to remain mere matters of the moment. They had the brilliance that attracts the eye of Time, and the qualities of substance that endure its appraisal.

Dr. Legge was an immediate friend and quick supporter of this Journal when it was established in 1932, and the contents of many of its early issues were greatly enriched by his strong and timely editorial comments, his authoritative articles, his series on the history of industrial medicine, and his essays on the life and times of Ramazzini. For more than 20 years he was one of its Associate Editors, always ready with wise counsel and helpful suggestions. His "Dr. Legge's Almanac" will be remembered as a popular feature of the successive issues of 1952 and '53.

Fortunate in the fullness of his years, Dr. Legge witnessed the realization of most of the projects that had his deep heart interest — among them the building of the Colwell Memorial Hospital on the University campus in 1930, the establishment of the University's School of Public Health in 1942, the completion of the History of Occupational Health in America soon to be published, and the invitation to the International Congress on Occupational Health to meet this year in the United States. The one fond hope denied him: to attend the Congress in July, and greet his friends from overseas in his own land as they so often welcomed him in theirs. Veterans of many Congresses will miss him, most with a sense of personal loss.

Dr. Legge was appreciative of his many honors,[2] but he never sought them. If they came, he wore them well; if not, he was no whit abated. As to some, he was one of those rare recipients who grace a tribute by adding to it more distinction than it gives.

He died amid the settings and the scenes he loved. Standing, in his academic robe, at the foot of the Campanile as the procession was forming for the University's Charter Day ceremonies on March 21, he suddenly collapsed and fell. He was pronounced dead on arrival at Berkeley's Herrick Memorial Hospital, apparently from a heart attack. As one of his friends remarked, it was as he would have wanted it to be.

To him, and to our long and happy association with him, we say farewell. "He was a man! Take him for all in all, we shall not look upon his like again."

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—A.D.C.

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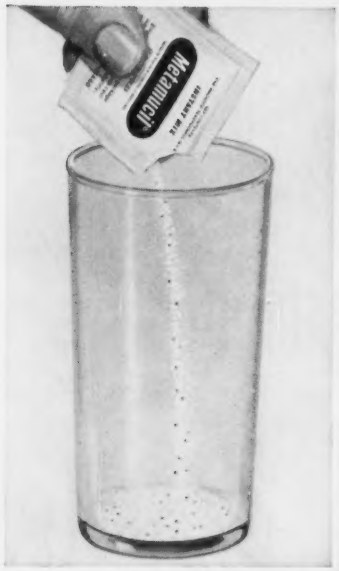

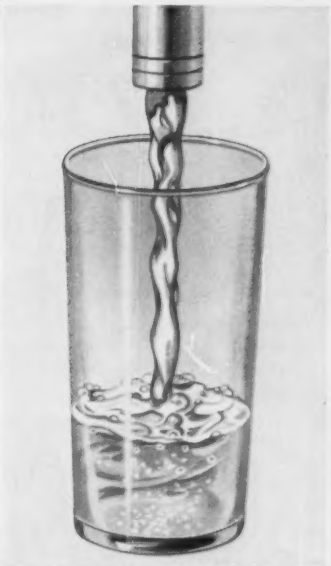

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COMMENT AND OPINION

Presenteeism

"Presenteeism" is on the increase at Sylvania Waltham Laboratories, Mass., the company reports after a sustained campaign to reduce absenteeism. Names of employees with perfect four-month attendance records are listed in an employee publication, and a bar graph illustrates the improved attendance record over the previous period.

—*Industrial Relations News*, February 6, 1960.

Industrial Medicine Synopsis

Occupational illnesses, which presently number about 3,000 in this country, are increasing at the rate of approximately 200 new disease entities a year, according to the current issue of *Patterns of Disease*. The publication reports that occupational illnesses now account for an estimated 10% of the total annual U. S. wage loss of $4,200,000,000 due to illness.

The increased incidence of occupational diseases is attributed mainly to new chemical compounds being introduced by industry at the rate of one every 24 minutes. Of these, a significant number possess properties potentially harmful to workmen.

One possible danger in this constantly increasing production is the risk of exposing workmen to new and unknown carcinogens. "New products and methods of production should be carefully studied in order to guard against such harmful exposure."

Health hazards in industry range from fiber glass to actinic rays. In one study of more than 300,000 civil service personnel, 18% of injuries and medical conditions were of occupational origin.

Physical agents (e.g. actinic rays, heat, cold, pressure) produced the highest incidence rate of these occupational conditions, accounting for 42%; skin irritants (e.g. oils, greases, acids and alkalies, fiber glass) ranked

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The dates of the course are August 8-13 and the fee of $200 includes tuition, board and room. Requests for further information should be made to William A. Macomber, Colby College, Waterville, Maine.

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Medical Director: 7 yrs, Med Dir, heavy indus; 8 yrs, Med Dir, major co; highly quald all phases Indus & Pref Med; member State Med Society's committee on Indus Hlth; will consider Asst Directshp, very lge co, semi-heavy heavy or chem indus with good advancmt potential; prefers E; references unite in outstndg commendations.

Medical Director or Assistant Medical Director: Working towards Cert'n, Indus Med; 2 yrs, Flight Surg, USAF; 4 yrs, Med Dir, engine co; background includes post-grad trng, Aviation Med-1 yr, Ind & Occup Skin Disease —1½ yrs, Psych & Occupl Hlth; seeks MW or SW; Age 33.

Director of Aviation Medicine: Cert'd, Prev Med; MPH, Johns Hopkins Univ; trng includes 1½ yrs, Ortho Res; 10 yrs, Dir of Professional Services & Avia Med, USAF; now retiring from military; will accept foreign or domestic post. Industrial Medicine.

Generalist: Seeks primarily foreign appointment, Indus Med; will consider others; 2 yrs, priv pract; 4 yrs, Indus Med work; age 34.

Generalist: 28; strong interest career indus med; MD, Boston univ, Schl of Med; 2 yrs, med officer, USN; presently Sr Med Ofc, USN ord dept; mil serv completed; any locality; DNB; immediately available.

Industrial Physician: MD, Univ of Chicago; 5 yrs, Industrial work, alum chem co; seeks position w/advncmt potential, about $18,000 sal; will consider any location; late 30's.

Industrial Physician: 2 yrs, private pract exper; now seeks advantage of Indus salaried position where Int med & card trng will be of value; Age 37.

Industrial Physician: 5 yrs, priv genl pract; seeks Indus post only; prefs Tex, La, So. Carolina, will consider foreign; age 28.

Industrial Physician: MPH, Univ of Mich; MD, Colo; 1 yr, post-grad, Indus Hlth, Harvard; 6 yrs, Indus phys, important oil co; seeks full-time indus hlth wk—dir active med, Indus hygiene & safety progm; Kansas city area; age 36.

Industrial Physician: 7 yrs, owned & oper'd 50 bd hsp; wishes change in med career; seeks Indus post combining med abil w/adm, counseling or clin rsrch; prefs SW or MW, but will locate anywhere; Age 35.

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Industrial Physician: 2 yrs, medical officer; USAF; 1 yr, private pract; 2 yrs, Asst Phys, important foundation hosp; 1½ yrs, genl clinic practice; seeks industrial medicine post in Florida, Alabama, or Georgia only; Age 37.

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second, with 35%; and inhalation hazards (e.g. mists and fumes, dusts, gases) were third, with 20%.

Commonest industrial health problem is occupational dermatitis, and about 90% of dermatoses are caused by contact with chemicals.

In the manufacturing industries, slightly less than half of occupational dermatitis cases are attributed to petroleum products. Despite its incidence, however, occupational dermatitis tends to be temporary in nature and less costly than most other occupational diseases (average cost per case in New York is $698).

Still the number one occupational disease in the U. S. in terms of disability and compensation costs, despite advances in dust control measures, is silicosis. Silicosis claims, for example, which represent only 3% of claims, account for more than one quarter of all compensation awarded in occupational disease cases by the New York State Workmen's Compensation Board.

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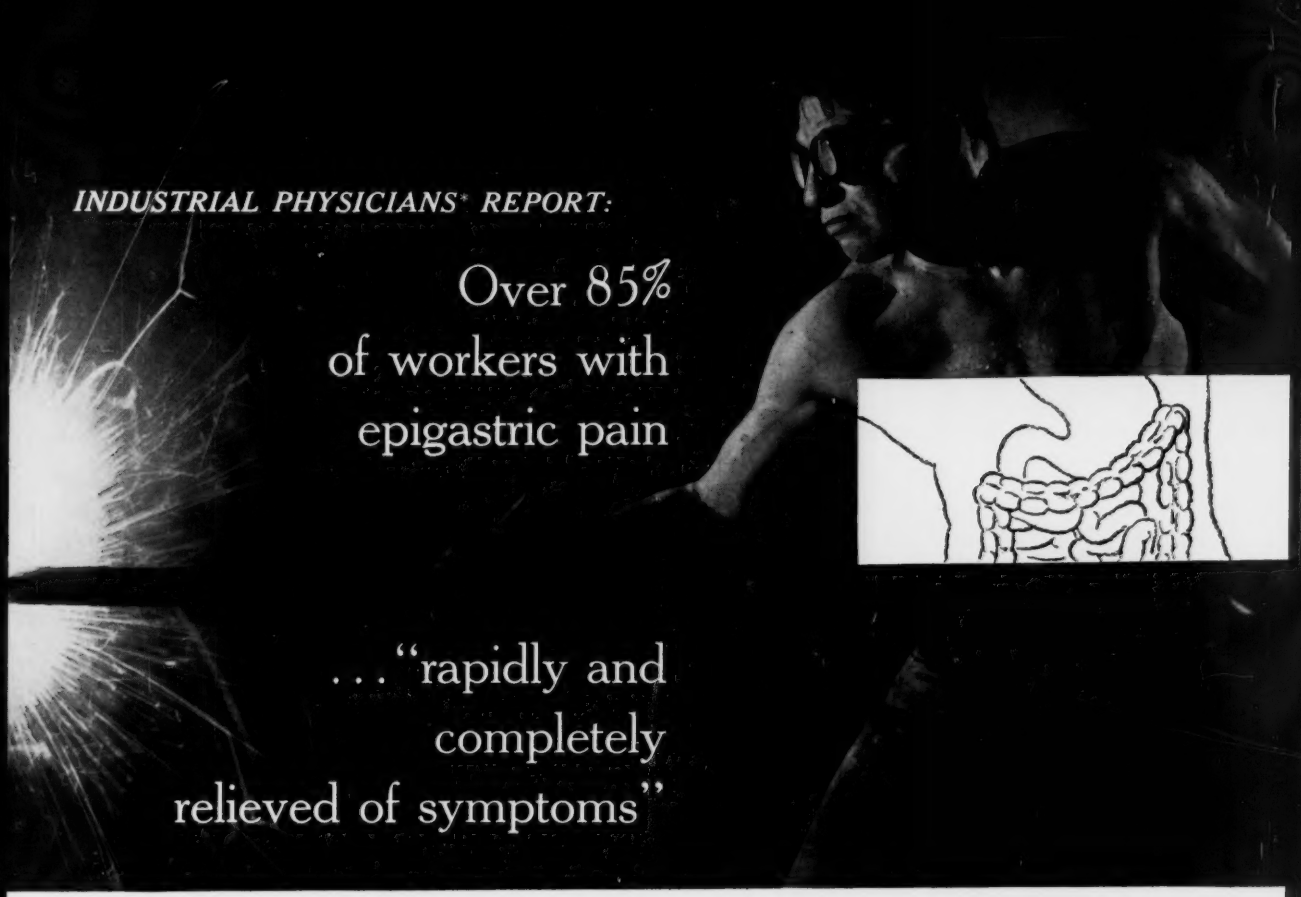
Executive 'Tension Illnesses' Myth Exploded

Are executives more prone to certain illnesses than nonexecutives? Contrary to popular belief, executives do not have a higher incidence of heart conditions or tension disorders than other employees with less responsibility, *Patterns* states. In fact, one study of close to 1,400 employees showed a slightly lower incidence of such conditions as hypertension, arteriosclerosis and myocardial infarction among executives than nonexecutives. In another study analyzing the prevalence of some 16 medical conditions, only two conditions ranked significantly higher among executives. They were arthritis and rheumatism and "back" cases (both twice as high). On the other hand, hernias occurred almost three times as frequently among nonexecutives. Possibly executives are healthier than other workers to start with, or have means of releasing tensions, or take better care of themselves than other workers.

However, the popular notion of women as the weaker sex — in terms of their work record in industry — is upheld. Over the past 10 years the number of women employed has increased by 50%, to the point where there are now 22,000,000 women workers — one third of our working force. Of these, 9,000,000 are married, while 1,000,000 or more are heads of families with no employed relatives.

A new health problem resulting from this increase is absenteeism among women workers. In one company, for instance, women constituted only slightly more than 25% of the working force, yet were responsible for 49% of disability cases, 63% of weeks lost from work, and 95% of excess lost time cases. "Most excessive absenteeism was among married women 50 to 20 years old and season of greatest absenteeism was summer — when children were on vacation from school!"

Another major medical prob-



INDUSTRIAL PHYSICIANS REPORT:*

Over 85% of workers with epigastric pain

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Noting that gastrointestinal symptoms were the chief complaints of more than half the workers reporting for treatment to their industrial clinic, Barden and co-workers* undertook an evaluation of Donnatal in providing rapid relief and minimizing absenteeism.

Based upon repeated clinical observation, case records, and progress reports over an eight-month period, the investigators conclude that Donnatal is "particularly effective for the relief of pain associated with smooth muscle spasm of the gastrointestinal tract." They observe also that:

"More than 85% of patients with epigastric pain and discomfort were rapidly and completely relieved of symptoms."

"... many employees were able to resume work within an hour."

"There was no evidence of undesirable side reactions."

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are particularly useful for industrial therapy, because once-a-day dosage provides effective spasmolysis for a twelve-hour period without the inconvenience of the customary four-hour dosage schedule. True *extended action* spasmolytic effects are provided by the special construction of Extentabs. Immediately after administration the equivalent of one Donnatal tablet is released, followed by the gradual and uniform release of the equivalent of two more Donnatal tablets, to provide sustained effects for 10 to 12 hours.

Each Donnatal tablet or capsule or each 5 cc. teaspoonful of Donnatal Elixir contains: hyoscyamine sulfate 0.1037 mg., atropine sulfate 0.0194 mg., hyoscine hydrobromide 0.0065 mg., phenobarbital (¼ gr.) 16.2 mg.—bottles of 100, 500, and 1000 tablets or capsules, and bottles of 1 pint and 1 gallon of elixir.

Donnatal No. 2 Tablets contain the same amounts of belladonna alkaloids with 32.4 mg. (½ gr.) phenobarbital per tablet—bottles of 100 and 500 tablets.

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*Frank W. Barden, M.D., Paul S. Hill, M.D., William F. Mahoney, M.D., and Kenneth J. Cuneo, M.D., in a report from the Medical Department of the Saco-Lowell Shops and the Webber Memorial Hospital, Biddeford, Maine; published in the January, 1954 issue of the Journal of the Maine Medical Association (Vol. XXXXV, No. 1, Page 11).

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lem in industry is that confronting employees stricken with our number one disease — heart disease. Heart disease affects workers in the most productive years when their skill and experience are of greatest use to industry. Yet, despite advances in rehabilitating heart disease sufferers, there is evidence that this condition may seriously hamper employment possibilities.

A survey of industries in Minnesota showed that nearly 60% of companies seldom or never hire persons with known heart disease and about 3% require cardiac employees to seek work elsewhere. A large factor in reluctance of employers to hire cardiac patients is Workmen's Compensation or group insurance and sick-leave liability claims. More and more, however, cardiac patients can and do return to work — thanks to an intensified program of rehabilitation, vocational guidance, and selective placement. In the same Minnesota survey, about two-thirds of patients surviving attacks returned to their former place of employment, and about one-half of these to their former job.

Need for Periodic Examination

The importance of periodic examinations, as an important contribution to occupational health, is underscored. In spite of variations in examinations, at least 15% and as many as 40% of persons examined are found to have a significant disease or defect previously unknown. Disorders found most frequently in periodic examinations include obesity, arthritis and rheumatism, hypertensive disease, arteriosclerotic heart disease, and hemorrhoids.

The value of safety programs is also emphasized. During the period 1926 to 1954, the national industrial accident frequency was reduced by 75%; absenteeism rates were cut in half; compensation rates were reduced by two-thirds; and accident-sickness costs were decreased by 40% to 50%. A major reason for this changing picture is the application of preventive medicine to industry with the subsequent emergence of more industrial health and safety programs.

Certain jobs remain more dangerous than others, with coal mining still heading the list. Too, logging and heavy construction industries exact a relatively high toll of injuries and deaths due to them. Injuries are also common in the roofing and sheet metal industries, but most of them are minor. On the other hand, electric light and power workers have a low rate of injury, but a higher death rate per 1,000 injuries than miners or loggers.

Two major needs in the occupational health field are better compensation coverage and more adequate state health facilities.

Nineteen states have only partial coverage for occupational diseases, that is, only specified diseases are covered by the Workmen's Compensation Laws. Two states have no provisions covering occupational diseases. About half the states limit medical benefits,

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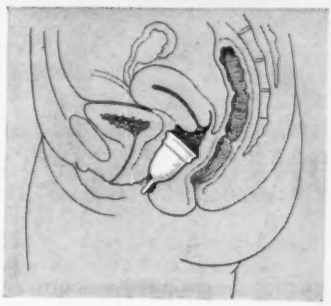

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in terms of duration and cost of treatment, in occupational disease cases. In some states, arbitrary limitations are placed on extent of treatment for certain pneumoconioses (lung conditions).

Most states have occupational health divisions in their state health departments, but these are hampered by lack of funds and personnel. It notes that while 40 states, plus the District of Columbia and Puerto Rico, have a total of 76 occupational health divisions staffed by 484 professional personnel, the majority of these are engineers, chemists, physicists and other nonmedical workers, only a few being physicians or nurses. Thus the state occupational health divisions are able to reach only 10% of the nation's workers each year.

More physicians, however, are entering industrial medicine. In a 25-year period physicians working in industrial medicine full-time have increased more than five-fold, from 232 in 1934 to 1,217 in 1958.

Too, the number of physicians — mainly GPs — engaging in this field is increasing. Since the vast majority of business enterprises have less than 500 employees, and therefore cannot afford facilities or personnel for industrial health program, medical care for workers in these enterprises is provided most often by general practitioners.

A poll by the American Academy of General Practice some years ago indicated that 93% of its members have some direct or indirect responsibility for medical care of patients with diseases of occupational origin.

Conductor's Elbow

Conductor William Steinberg has been suffering from bursitis in his left elbow and has had his arm in a sling for some time. The ailment was called an "occupational disease of conductors." A physician had told Steinberg he should not conduct for at least four weeks. The advice has been ignored.

No Leisure Society

Leisure has a low status in American society, says Sociology Prof. Norman D. Kurland, Hofstra College, N. Y. "There is a universally expressed desire to retire and live a life of leisure, but in practice this is to be desired and accepted only after social position and material security have been attained," Prof. Kurland states. Automation, technological change, and collective bargaining have given the working man increased leisure time at no loss of income. However, many persons continue to work long hours to improve their material position in society. The underlying reason, says Prof. Kurland, is that most people don't know how to use their leisure constructively or pleasurably. —*Industrial Relations News*, March 26, 1960.

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(aerosol foam)

eases pain, spasm; improves function

Deeply absorbed to permeate affected sensory endings, the proven local analgesic-anesthetic agents in GER-O-FOAM give relief in minutes, lasting for hours in . . . rheumatoid arthritis, osteoarthritis, muscle sprain, fibromyositis, low back pain, etc.

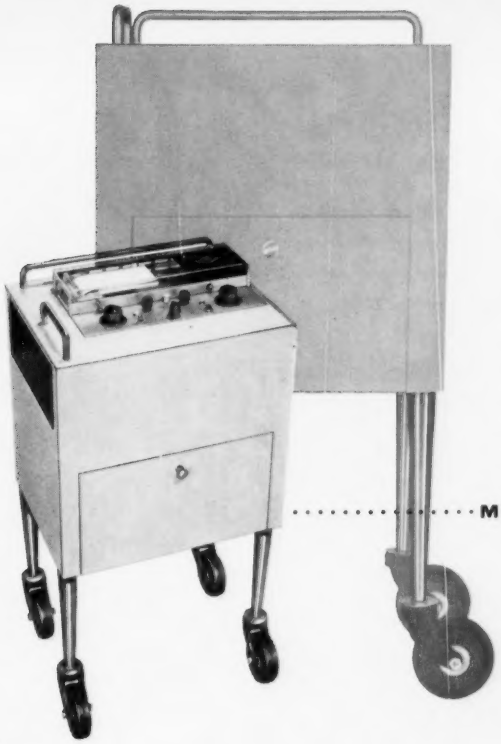
IN A NEW CLINICAL STUDY[1] GER-O-FOAM gave "satisfactory" results in 85% of chronic musculoskeletal patients. Response was "striking" in certain intractable acute conditions . . . "permitting functional exercises otherwise impossible."

GER-O-FOAM combines: Methyl salicylate 30%, benzocaine 1%, traces of volatile oils in a specially processed, neutralized emulsion base, for aerosol use.

samples, reprint and literature from

GERIATRIC PHARMACEUTICAL CORPORATION Bellerose New York

1. Gordon, E. E. and Haas, A.: Industrial Medicine & Surgery 28:217, 1959.



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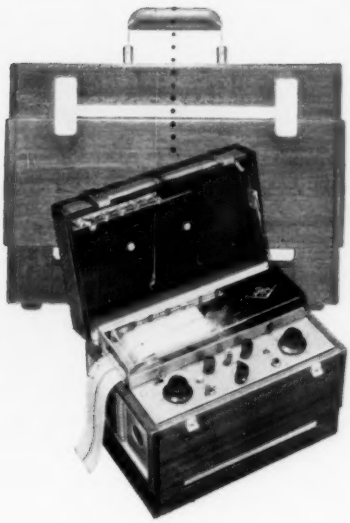
PORTABILITY

OFFICE VERSATILITY



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Each ECG has *particular* usefulness . . . and each offers *proven* design and performance. Ask your nearby Sanborn man to demonstrate the instrument of your choice — designed for *your* needs.

SANBORN COMPANY

MEDICAL DIVISION, 175 Wyman St., Waltham 54, Massachusetts

New Concept in Comfort for the Sacro-iliac Patient

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GOLDEN CROWN ®
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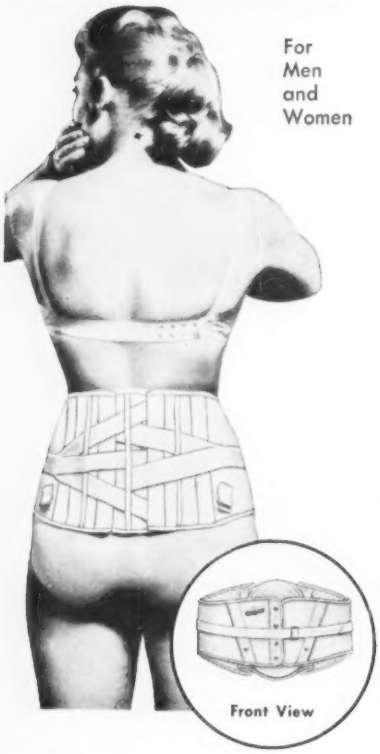

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Front View

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†U.S. Patent No. 2,895,877

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